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THE

INFLUENCE

OF

TROPICAL CLIMATES

ON

EUROPEAN CONSTITUTIONS.

By JAMES JOHNSON, M.D.

PHYSICIAN TO THE LATE KING, ETC.

AND

JAMES RANALD MARTIN, Esq.

LATE PRESIDENCY SURGEON, AND SURGEON TO THE NATIVE HOSPITAL, CALCUTTA.

Sixth Edition, revised and greatly improved.

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PREFACE

TO THE SIXTH EDITION.

By Dr. JOHNSON.

Twenty-eight years have now rolled over the Author's head, since the first edition of this work saw the light. In that space of time five thousand copies have been distributed through our Eastern and Western possessions —besides many of our extra-tropical colonies.

It is gratifying to the Author to know that the demand for his work has been steady and uninterrupted—the fifth edition having been exhausted in less time than any of its predecessors required. Although successive editions have received additions and improvements, yet, very few of the Author's original doctrines have been subverted, or practices exploded, during a period of more than a quarter of a century.

This is the more to be wondered at, when it is considered that the Author was not twenty-five years of age when the work was composed, or at least when the materials were collected. The reader will perceive that in this edition I have been joined and greatly assisted by a gentleman who has had long and ample experience in diseases of the East, where he rose to professional honours and distinctions, and from whence he has now returned, in the prime of life, in the maturity of judgment, and with a vast fund of scientific and practical information.

The articles which Mr. Martin has contributed to this edition, are subscribed with the initials of his name, and will speak for themselves; but as my excellent collaborateur and confrere may have something also to say, I shall conclude with offering my grateful thanks to an indulgent public for the patronage I have so long received.

Suffolk Place,
1*st October,* 1841.

J. JOHNSON.

PREFACE BY MR. MARTIN.

THE materials of the brief sketches now incorporated in Dr. Johnson's well known work, appeared originally in an official report on the climate and diseases of Calcutta, of which two editions were ordered to be printed at the public cost by the Supreme Government of India.

These sketches were the result of observations made in the earlier period of my service, with troops engaged in active military operations in some of the most unhealthy countries in India, and in the Burman Empire, during the late war with that State; confirmed subsequently in an extensive hospital and private practice amongst both Europeans and Natives, in the British Indian Capital. The mode of their first appearance was, as I have said, official;—indeed, they were thrown together without care, and in the hurry of excessive professional labour, with the sole view of affording such facts and materials as might assist a public inquiry I then suggested into the health history of Calcutta, and the existing condition of that city and the surrounding country, with a view to their improvement; as I had very early satisfied myself that, if we would effectually attend to the welfare of its vast population, we must adopt measures of correction and prevention in vigorous and systematic form. On this subject, I had previous official and personal communication, first in 1821, and then in 1828, with the Governors-General of India; but it was not till 1835 that effectual measures were taken for a full investigation into the various and important matters connected with the subject.

So much for my portion of the present volume:—respecting which I have nothing more to say than that it was framed without hope or expectation of its ever attaining to European publicity, and years before I had the pleasure of communication, directly or indirectly, with the author of the celebrated work on the "Influence of Tropical Climates on European Constitutions;"—indeed, my first communication of any kind with that gentleman was to claim his assistance towards the restoration of health,

impaired by an arduous service of two-and-twenty years in tropical countries.

To conclude, with a word to my brother officers of the Indian Army.

An inquiry into the external causes of disease in hot climates, and a reference to the topographic and statistical facts detailed in the recently published Reports on the health of the British Army and Navy, must satisfy any person that some of the modes of investigation hitherto pursued are insufficient to a full or accurate illustration of those all-important questions; for, so many exceptions have been found in the East and West Indies, but especially in South America, to the reputed causes of many diseases, as to make it no easy matter whether to determine in favour of the rules commonly received, or of the numerous and extended exceptions to them.

It therefore behoves the officers of the Indian Medical Staff in an especial manner to exercise their talents and the great opportunities within their reach, on this subject. Let them seriously examine the influences of general tropical climate, of locality, and of season on European health: such objects are in reality of more value than volumes of cases or details of routine practice; their careful investigation will confer permanent benefits on the public service, and, sooner or later, derive honour to themselves, difficult if not impossible to be obtained in any other way. Let them follow the example so worthily set by Dr. James Johnson in the East, and by Drs. Robert Jackson and William Fergusson in the West Indies:—*let them observe and record in early life.*

Grosvenor Street, Grosvenor Square,
October, 1841.

J. R. MARTIN.

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THE

INFLUENCE OF TROPICAL CLIMATES

ON

EUROPEAN CONSTITUTIONS.

Sixth Edition.

PRELIMINARY OBSERVATIONS.

Sect. I.—I believe it is a general opinion among Philosophers, that the Constitution of Man is better adapted to bear those changes of temperature and other circumstances, experienced in migrating from a northern to a tropical region, and vice versâ, than that of any other animal. They proudly observe, that this power of accommodating itself to all climates, is a distinctive characteristic of the human species, since no other species of animal can endure transplantation with equal impunity. But, I think, it would not be difficult to shew, that for this boasted prerogative, man is more indebted to the ingenuity of his mind, than to the pliability of his body. To me, indeed, it appears, that he and other animals start on very unequal terms in their emigrations. Man, by the exertion of his mental faculties, can raise up a thousand barriers around him, to obviate the deleterious effects of climate on his constitution; while the poor animal, tied down by instinct to a few simple modes of life, is quite defenceless. Nature must do all for the latter; and in fact, it is evident that this indulgent mother does compensate, in some degree, for the want of reason, by producing such corporeal changes, as are necessary for the animal's subsistence under a foreign sky, in a *shorter* space of time than is necessary for effecting correspondent changes in man. One example may suffice. The tender and innocent sheep, when transported from the inclemency of the North, to pant under a vertical sun on the equator, will, in a few generations, exchange its warm fleece of *wool* for a much more convenient coat of *hair*. "Can the Ethiopian change his hue," in the same period, by shifting from the interior of Africa to the shores of the Baltic? Or will it be said, that the fair complexion of Europeans may, in two or three generations, acquire the sable

aspect of the inter-tropical natives, by exchanging situations? Assuredly not. Where then is the superior pliancy of the human constitution? The truth is, that the tender frame of man is incapable of sustaining that degree of exposure to the whole range of causes and effects incident to, or arising from vicissitudes of climate, which so speedily operates a change in the structure, or, at least, the exterior, of unprotected animals.

But it is observed, that of those animals translated from a temperate to a torrid zone, "many die suddenly, others droop, and all degenerate." This is not to be wondered at, considering the disadvantages under which they labour. Man would not fare better, if placed in similar circumstances. Even as it is, the parallel is not far from applying. Of those Europeans who arrive on the banks of the Ganges, many fall early victims to the climate, as will be shewn hereafter. That others droop, and are forced, in a very few years, to seek their native air, is also well known. And, that the successors of all would *gradually degenerate*, if they remained permanently in the country, cannot easily be disproved; while a very striking instance, corroborative of the supposition, may be here adduced.

Whoever has attentively examined the posterity of De Gama, and Albuquerque, now scattered over the coast of Malabar, the plains of Bengal, and the island of Macao, once the theatres of Lusitanian pre-eminence, will be tempted to question their alliance with ancestors, who "dared the elements and pathless seas" to establish an Empire in the East—ancestors who, compared with these, must indeed have been "beings of *another mould.*"

In answer to this, it will be alleged, "that they have married and blended with the natives until all shade of distinction is obliterated." But it is well known to those who have resided long in India, that the two great prevailing classes of society in that country, the Hindoos and Mahomedans, hold these descendants of the Portuguese in the most marked and sovereign contempt; while the latter, still retaining a remnant of the religion, and all the prejudice of their progenitors, entertain an equal abhorrence of their idolatrous and infidel neighbours. This being the case, we may fairly presume, that the intermixture has been much less extensive than is generally supposed; an inference strongly supported, if not confirmed, by the well-known fact, that, while the people in question have forfeited all pretensions to the European *complexion*, their more stubborn *features* still evince a descent, and establish their claim to an ancestry, of which they are superlatively proud. Let those who deny *one common origin* of mankind, and that climate is the *sole* cause of complexion, explain this phenomenon if they can.

On the other hand, if we look at inter-tropical natives approaching our own latitudes, the picture is not more cheering. The African children brought over by the Sierra Leone Company for education, seldom survived the third year in this country. "They bear the first Winter (says Dr.

Pearson) tolerably well, but droop during the second, and the third generally proves fatal to them."

The object of these remarks, which at first sight might seem irrelevant, will now appear.—Since it is evident that Nature does not operate more powerfully in counteracting the ill effects of climate on man, than on other animals, it follows that we should not implicitly confide, as too many do, in the spontaneous efforts of the constitution, but, on the contrary, call in to its aid those artificial means of prevention and melioration, which reason may dictate and experience confirm. In short, that we should study well the climate, and mould our obsequious frames to the nature of the skies under which we sojourn.

That these salutary precautions are too often despised or neglected, a single quotation from a gentleman, who has resided more than twenty years in India, and whose talent for observation is, in my opinion, unequalled, will put beyond a doubt. "Nothing can be more preposterous (says Captain Williamson*), than the significant sneers of gentlemen on their first arrival in India; meaning thereby to ridicule, or to despise, what they consider effeminacy or luxury. Thus several may be seen walking about without chattahs (*i. e.* umbrellas) during the greatest heats. They affect to be ashamed of requiring aid, and endeavour to uphold, by such a display of indifference, the great reliance placed on *strength of constitution*. This unhappy infatuation rarely exceeds a few days; at the end of that time, we are too often called upon to attend the funeral of the self-deluded victim."†

Before proceeding to the individual disorders which prevail in hot climates, I shall briefly allude to some of those gradual and progressive changes in the constitution, and deviations from previous health and habits, which, though predisposing and verging towards, yet fall short of actual disease. These are consequences which all must expect, more or less, to feel, on leaving their native soil, and, of course, in which all are directly interested. For although a few individuals may occasionally return from even a long residence in hot climates, without having suffered any violent illness, or much deterioration of constitution; yet the great mass of Europeans will certainly experience the effects sketched out under this head, and many others of minor consequence, which will be taken notice of in different parts of the work. It is, however, by the most scrupulous attention to these *incipient deviations from health*, by early arresting their growth, or at least retarding, as much as possible, their progress, that we can at all expect to evade those dangerous diseases, to which they inevitably, though often imperceptibly, tend.

Sect. II—The transition from a climate, the medium heat of which is 52°

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* Author of "Oriental Field Sports," "East India Vade Mecum," &c.

† East India Vade Mecum, vol. ii. p. 11.

of Fahrenheit, to one where the thermometer ranges from 80° to 100°, and sometimes higher, might be supposed, *á priori*, to occasion the most serious consequences. Indeed, the celebrated Boerhaave, from some experiments on animals, concluded that the *blood would coagulate in our veins*, at a temperature very little exceeding 100°. More modern trials, however, have proved that the human frame can bear, for a short time at least, more than double the above degree of atmospherical heat, and that too, without greatly increasing the natural temperature of the body.

The benevolent Author of our Existence has endowed man, as well as other animals, with the power, not only of generating heat, and preserving their temperature in the coldest regions of the earth; but has also provided an apparatus for carrying off any superabundance of it that might accumulate where the temperature of the atmosphere approaches to or exceeds that of the body. With the *former* process, which is supposed to be carried on in the lungs, we have at present nothing to do; the *latter* is one which deserves great attention, and which will meet with ample consideration in various parts of this essay.

We are no sooner beneath a vertical sun than we begin, as may naturally be supposed, to experience the disagreeable sensation of unaccustomed warmth; and as the temperature of the atmosphere, even in the shade, now advances to within ten or twelve degrees of that of the blood, and in the sun very generally exceeds it, the heat, perpetually generated in the body, cannot be so rapidly abstracted, as hitherto, by the surrounding air, and would, of course, soon accumulate, so as to destroy the functions of life itself, did not Nature immediately open the sluices of the skin, and by a flow of *perspiration*, reduce the temperature of the body to its original standard.

Whether the superabundant animal heat combines with the perspirable fluid, and thus escapes; or whether the refrigeration takes place on the principle of evaporation, is more a matter of speculation than practical importance to ascertain. We know the fact, that perspiration is a cooling process. The modus operandi—let our Chemical Philosophers settle if they can.

When we contemplate this admirable provision of Nature, against what might appear to us an unforeseen event;—when we survey the resources and expedients which she can command on all emergencies—her power of supplying every waste, and restraining every aberration of the constitution, we would be almost tempted to conclude, that man was calculated for immortality! But alas!

"Nascentes morimur, finisque ab origine pendet,"

till at length, this wonderful machine, exhausted by its own efforts at preservation, and deserted by its immaterial tenant, sinks, and is resolved into its constituent elements!

But, to return. We must not conclude that this refrigerating process, adopted by Nature to prevent more serious mischief, is, in itself, unproductive of any detriment to the constitution. Far otherwise. "If (says Dr. Currie) the orifices do *not* pour out a proportionate quantity of perspiration, disease must ensue from the direct stimulus of heat; and if the *necessary* quantity of perspiration takes place, the system is *enfeebled* by the evacuation."*

Here, then, we have Scylla on one side, and Charybdis on the other;—morbid accumulation of heat if we do not perspire enough—debility if we do. How are we to direct our course through this intricate and dangerous navigation?

Dr. Currie.

"Europeans who go to the West Indies are more healthy in proportion, as they perspire freely, especially if they support the discharge by a moderate use of *gently stimulating liquids, stopping short of intoxication.*"

Dr. Moseley.

"I aver from my own knowledge and custom, as well as from the custom and observations of others, that those who drink *nothing but water* are but little affected by the climate, and can undergo the greatest fatigue without inconvenience."

Without meaning to set up the judgment of a Moseley in competition with that of a Currie, on other subjects, candour obliges me to confirm, by personal observation and experience, the truth of Dr. Moseley's remark. Dr. Currie never was in a tropical climate, and, therefore, he had the above piece of information from others; and it is one of the very few erroneous positions in his invaluable work. Nevertheless, these apparently opposite directions, are not so contradictory in *fact* as in *terms*. The principle on which both act is the same, though the means are different. Dr. Currie's plan of supplying the stomach with "gently stimulating liquids," will undoubtedly keep the morbid heat from accumulating, by driving out a copious perspiration; but it will, at the same time, lead to debility, by carrying off much more of that fluid than is necessary; by which means the thirst, instead of being allayed, will be increased; and, what is still worse, the body will be rendered more susceptible of the subsequent impressions of cold, the deleterious effects of which, at these times, are much more extensive than is generally believed, as will be shewn in another part of the work.

Dr. Moseley's plan, on the other hand, far from preventing perspiration, will be found, in general, to promote it, but at the same time restrain its *excess*.—A familiar example or two will elucidate this subject.

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* Medical Reports, vol. 1, p. 278.

We will suppose two gentlemen to be sitting in a room, at Madras, or in Jamaica, just before the sea-breeze sets in, both complaining of thirst, their skin hot, and the temperature of their bodies 100° or two degrees above the natural standard.

One of them, pursuant to Dr. Currie's instructions, applies to the sangaree bowl, or porter cup, and after a draught or two, brings out a copious perspiration, which soon reduces the temperature to 98°. It will not stop here, however, nor indeed will the gentleman, according to the plan proposed; for, instead of putting the bulb of the thermometer under his tongue, to see if the mercury is low enough, he, feeling his thirst increased by the perspiration, very naturally prefers a glass or two more of the sangaree—"to support the discharge"—still, however, "stopping short of intoxication." Now, by these means, the temperature is reduced to 97° or 96½° in which state, even the slight, and otherwise refreshing chill of the sea-breeze, checks more or less the cuticular discharge, and paves the way for future maladies.

Whether this is, or is not, a true representation of the case—let Dr. Currie's own words decide.

"If, says he, (*ut supra*) the necessary quantity of perspiration takes place, (viz. by the use of gently stimulating liquids,) the system is enfeebled by the evacuation, and the extreme vessels losing tone *continue* to transmit the perspirable matter, *after* the heat is reduced to its natural standard, or, perhaps, *lower;* in which situation, we can easily suppose that even a *slight degree* of external cold may become dangerous."—Vol. 1. p. 278.

Let us now turn to the other gentleman, who pursues a different line of conduct. Instead of the more palatable potation of sangaree, he takes a draught of plain cold water. This is hardly swallowed before the temperature of his body loses by abstraction alone, one degree, at least, of its heat. It is now, we will suppose, at 99°. But the external surface of the body immediately sympathising with the internal surface of the stomach, relaxes, and a *mild* perspiration breaks out, which reduces the temperature to its natural standard, 98°. Farther, this simultaneous relaxation of the two surfaces, completely removes the disagreeable sensation of thirst; and, as the simple "antediluvian beverage" does not possess many Circean charms for modern palates, there will not be the slightest danger of its being abused in quantity, or the perspiratory process being carried beyond its salutary limits. Nor need we, on the other hand, apprehend its being neglected; since, from the moment that the skin begins to be constricted, or morbid heat to accumulate, the sympathising stomach and fauces will not fail to warn us of our danger, by craving the proper remedy. Taken therefore as a general rule, the advantages of the *latter* plan are numerous—the objections few. It possesses all the requisites of the *former* in pro-

curing a reduction of temperature (the only legitimate object which the admirers of sangaree and copious perspiration can have in view) without any danger of bringing it below the proper level, or wasting the strength, by the profuseness of the discharge.

It is true, there is no general rule without exception; and there may be instances wherein the use of "gently stimulating liquids" is preferable to that of cold drink.

For example: during, or subsequent to violent exertion, under a powerful sun; or in any other situation in a tropical climate, when profuse perspiration is rapidly carrying off the animal heat, and especially when fatigue or exhaustion has taken place, or is impending—then cold drink would be dangerous, on the same principle as external cold. In persons also who have been for some time in the climate, and whose digestive organs are enfeebled, some weak wine and water, or even weak brandy and water, would not be objectionable. But this indulgence is by no means necessary in the young and vigorous, and should be reserved for ulterior residence and more advanced periods of life.

I have been more prolix on this point, than may have seemed necessary to the medical reader; but, considering that this is generally the first erroneous step which Europeans take on entering the tropics, and that the function in question (perspiration) is more intimately connected with some other very important ones in the human frame, than is commonly supposed, I thought it proper to set them right, *in limine*. The probability of *future suffering* will rarely deter the European from indulging in *present gratifications;* but where these last, *i. e.* the stimulating liquids, are represented, from high authority, as not only innocent but salutary, it will require some strength of argument to persuade young men to relinquish their use, or to check the wide-spreading evil.

Sect. III.—In attempting to delineate the influence of hot climates on the European constitution, although we may endeavour—"to chain the events in regular array;" yet, it must be confessed, that Nature spurns all such artificial arrangements; since simultaneous impressions on several organs, must produce cotemporary and combined effects, which our limited faculties are scarcely capable of embracing in thought, much less of describing in the fetters of language. Taking facts, however, and personal observation for land-marks, I shall pursue the investigation, as nearly as possible, in the order of nature and events.

There exists between different, and often distant parts of the body, a certain connexion or relation, which, in medical language, is called "consent of parts:"—that is, when *one* is affected by particular impressions, the *other* sympathises, as it were, and takes on a kind of analogous action. This sympathy, or consent of parts, has never been *satisfactorily* accounted

for, by the ablest of our physiologists, nor—(mirabile dictu!) by the most ingenious of our theorists. As all, however, are agreed in respect to the *fact*, we must allow the *cause* to remain locked up in the bosom of Nature for the present.

Of these sympathies, none is more universally remarked, or familiarly known, than that which subsists between the *external* surface of the body, and the *internal* surface of the alimentary canal. This, indeed, seems less incomprehensible than many others, since the *latter* appears to be a continuation of the *former*, with the exception of the cuticle. In the first section, I gave an instance of the skin sympathising with the stomach, where the cold drink was applied to the latter organ. Had the water been applied to the external surface of the body, on the other hand, the stomach would have sympathised, and the thirst would have been assuaged.

The loss of tone, then, in the extreme vessels of the surface, in consequence of excessive, or long-continued perspiration is, on this principle, necessarily accompanied, or soon succeeded by a consentaneous loss of tone in the stomach, and fairly accounts for that anorexia, or diminution of appetite, which we seldom fail to experience soon after entering the tropics, or, indeed, during hot weather in England. Now this, although but a link in the chain of effects, seems to me a most wise precaution of Nature, to lower and adapt the irritable, plethoric European constitution, to a burning climate, by guarding very effectually against the dangerous consequences of repletion. This view of the subject will set in a clear light, the pernicious effects of stimulating liquids, operating on an organ already debilitated (probably for salutary purposes,) and goading it thereby to exertions beyond its natural power, producing a temporary plethora or excitement, with a great increase of subsequent atony.

A remark, which every person of observation must have made, even in this country, during the Summer, but particularly in equatorial regions, will farther elucidate this subject. If, by walking, for instance, or any other bodily exercise, in the heat of the sun, during the forenoon, especially near dinner hour, the perspiration be much increased, and the extreme vessels relaxed, we find, on sitting down to table, our appetites almost entirely gone, until we take a glass of wine, or other stimulating fluid, to excite the energy of the stomach. Under such circumstances of artificial or forced relish for food, it is not to be wondered at, that the digestion should be incomplete, and that the intestines should suffer from the passage of badly concocted aliment. Observation and personal feeling have taught me this, —that in hot climates, perhaps during hot weather in all climates, an hour's cool repose before dinner is highly salutary; and if, on commencing our repast, we find we cannot eat without *drinking*, we may be assured that it is Nature's caveat,—to beware of eating at all. This will be deemed hard

doctrine by some, and visionary by others; but I know it is neither the one nor the other; and those who neglect or despise it, may feel the bad consequences, when it is too late to repair the error.

There are several other causes, however, which operate in conjunction with the above, to impair the appetite:—one of which is, the want of rest at night. After disturbed and unrefreshing sleep, (but too common in tropical climates) the whole frame languishes next day, and the stomach participates in the general relaxation. The means of managing and obviating these effects, will be pointed out in the prophylactic part of this Essay.

Sect. IV.—We now take a wider range, and come to a subject more intricate in its nature, extensive in its bearings, and important in its consequences. It will readily be understood, that I allude to the influence of a tropical climate on the liver and its functions. This immense gland is the largest organ in the human frame; for neither the brain, heart, spleen, nor kidneys, can be at all compared with it; and the lungs, though occupying a larger extent when inflated, yet if condensed to equal solidity, would fall short in size and weight. Now, since Nature, throughout her works, has seldom been accused of supererogation, we may safely conclude that the importance of this organ's function, in the animal economy, is commensurate with its magnitude. The structure of the liver has been explored by the anatomist, and the bile secreted in it, analysed. But although the chemist has separated this fluid into its constituent parts, yet physiologists are not exactly agreed in regard to the purposes which it answers in the system. It is proved to be antiputrescent, and, in conjunction with the pancreatic juice, it probably assists in animalising and eliminating the chyle from the chyme.*

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* *Sir Benjamin Brodie's Experiments on Bile.*—The size of the liver, its being found in all animals, the effects of its derangements on general health, and various other considerations, have long induced us to smile at those physiologists who restricted its use in the animal economy to the elimination of some recrementitious matters from the blood, which elimination might be vicariously performed by other organs, as the lungs, without any great detriment to the constitution. The comparatively great size of this organ *in infancy*, when nutrition goes on in a more rapid manner than at any other period of life, and the great emaciation which so generally attends hepatic diseases, led us, at an early period of our professional experience, to conclude that the secretion of bile was intimately connected with chylification or the nutrition of the animal fabric. The experiments of our illustrious countryman, Sir B. Brodie, go directly to corroborate, or rather to prove, the truth of the above-mentioned conclusion. These experiments consisted in throwing a ligature around the ductus communis choledochus of an animal, so as to completely prevent the bile from entering the intestine, and then noting the effects produced on the digestion of the food swallowed immediately before or after the operation. These experiments were frequently repeated, and the results were uniform.

It may be proper to state that the operation of tying the choledoch duct in inferior animals, as the cat for instance, is easily accomplished, and at an expense of very trifling

It is supposed not to enter the circulation naturally, at least in an unchanged state along with the chyle; but there can be little doubt of its preventing the putrefactive or fermentative process from taking place in the excrementitious part, which is ultimately to be expelled the body. Another and a principal use of this important fluid appears to consist in stimulating the intestines to their peculiar peristaltic motion, and thus propelling their contents continually forward, to give the lacteals an opportunity of drinking up and conveying to the blood the nourishment by which our frames are supported. In this point of view, it is the natural tonic of the intestines, and also the purgative which frees them from all fæcal matter, the retention of which is productive of so much inconvenience, not to say disease.

The first effect of a tropical climate on the function of the liver, is universally allowed to be an *increase* of the biliary secretion. This is so evident in our own country, where the Summer and Autumn are distinguished by diseases arising from superabundant secretion of bile, that it would be waste of time to adduce any arguments in proof of the assertion. But why an increase of the atmospherical temperature should so invariably augment the hepatic secretion in all climates, and all classes of people, is totally unaccounted for. When Dr. Saunders conjectures that richness of blood,

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suffering; so that any derangement in the functions of the viscera, which follows, cannot reasonably be ascribed to the mere operation. The division of the par vagum near the cardia of the stomach, and the ligature of the whole extremity of the pancreas, which are operations of much greater difficulty and pain, did not at all interfere with the conversion of food into chyme, or that of the chyme into chyle.

In Sir B. Brodie's experiments, which were chiefly on young cats, the production of chyme took place in the stomach equally the same whether the ligature was on the ductus communis or not. But the conversion of chyme into chyle in the intestine was invariably and completely interrupted, when the bile was prevented from mixing with the chyme by the application of the ligature. "Not the smallest trace of chyle was perceptible either in the intestines or in the lacteals." The intestines contained a semi-fluid substance resembling the chyme found in the stomach, with this difference, however, that it became of a thicker consistence in proportion as it was at a greater distance from the stomach, and as it approached the termination of the ileum, the fluid part of it had altogether disappeared, there remaining only a solid substance, differing in appearance from ordinary fæces. The lacteals, under this state of things, contained a transparent fluid, which Sir B. supposed to consist partly of lymph, partly of the more fluid portion of the chyme which had become absorbed.

"I conceive," says Sir Benjamin, "that these experiments are sufficient to prove that the office of the bile is to change the nutritious part of the chyme into chyle, and to separate from it the excrementitious matter." Our author properly observes that, in the very few authenticated cases of total obliteration of the ductus communis in the human subject, there has always been extreme emaciation, shewing that the function of nutrition was not properly performed, so that these cases form no objection to the conclusions which our author has drawn.

In the prosecution of this inquiry, a circumstance occurred which illustrates the

tenseness of fibre, grossness of diet, and rapidity of circulation, are the causes of Europeans being at first more afflicted with bilious redundancy in India than the native Hindoos, he gives us only a *comparative* view of things, and leaves us completely in the dark with respect to the *modus operandi* of heat, as a general and universal spur on the secretory vessels of the liver.

Were this a question of mere curiosity, or theoretical speculation, I should pass it by unnoticed; but from long and attentive observation, as well as mature reflection, I believe that I have discovered a connexion between two important functions in the animal economy, which will let in some light on this subject, and lead to practical inferences of considerable importance.

The arguments and facts adduced in support of this connexion will be found under the heads Hepatitis, Dysentery, and in other parts of this Essay. In the meantime, I shall merely state in a few words the *result* of my observations, leaving the reader to give credit to it, or not, as he may feel inclined.

There exists then between the extreme vessels of the vena portæ in the liver, and the extreme vessels on the surface of the body—in other words, between *biliary secretion and perspiration*, one of the strongest sympathies in the human frame, although entirely unnoticed hitherto, so far as I am acquainted. That these two functions are regularly, and to appearance,

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great extent of the powers of Nature in restoring channels after they have been interrupted or destroyed by ligatures or other foreign injuries. The ligature round the duct was always a single silk thread, the ends of which were cut off close to the knot. If the animal was allowed to live he became jaundiced, as was seen by the eyes and urine. But at the end of seven or eight days, there was an effort made by Nature, in several instances, to repair the injury done by the operation, and to restore the passage of the bile into the intestine. When the animal was killed at the end of the period above-mentioned, it was found that, on pressing the gall-bladder, the bile flowed from the ductus communis in a full stream, notwithstanding the previous ligature. On further dissection Sir Benjamin found that a mass of coagulable lymph had been effused, adhering to the ductus communis above and below the ligature, and to the neighbouring parts, inclosing a cavity in which the ligature was contained. The pressure of the latter had caused the duct to ulcerate, without adhesion having taken place of the surfaces which had been brought into contact—and the ligature having been separated, lay loose in the cavity formed by the albumen which had been effused around it. Into this cavity the bile might be made to flow from the upper orifice, and out of it into the lower orifice of the ductus communis—and thus the continuity of the canal intended for the passage of the bile was restored. The physiologist, Sir B. Brodie remarks, will not fail to observe the difference between the effects produced by a ligature applied to an excretory tube, and a ligature applied to a sanguiferous vessel. This difference, however, is not invariably observed; for in Dr. Parry's experiments on the carotid of a sheep, it was found that new vessels were sent out from the carotid, traversed round the ligature or obliterated point of the artery, and re-entered the trunk of the same vessel again, thus completely restoring the course of the circulation.—*Journal of Science, January*, 1823.

equally increased, or at least influenced by *one* particular agent (atmospherical heat) from the cradle to the grave, from the pole to the equator, will be readily granted by every observer: and that this *synchronous action* alone, independent of any other original connexion, should soon grow up into a powerful sympathy, manifesting itself when *either* of these functions came under the influence of *other agents*, is a legitimate conclusion in theory, and what I hope to prove by a fair appeal to facts. This last consideration is the great practical one; for it is of little consequence whether this sympathy was originally implanted by the hand of Nature at our first formation, or sprung up gradually in the manner alluded to, provided we know that it actually exists, and that by directing our operations towards any *one* of the functions in question, we can decisively influence the *other*. This is what I maintain; but here I only offer assertions. In a future part of the work I shall bring forward facts and cogent arguments in proof of them. At present let this "consent of parts" between the skin and the liver, which I shall beg leave to denominate the "*Cutaneo-hepatic Sympathy*," account for the augmented secretion of bile, which we observe on arriving in hot climates, corresponding to the increased cuticular discharge. I shall here offer one practical remark, resulting from this view of the subject, and which will be found deserving of every European's attention on his emigration to southern regions: namely, that as the state of the perspiratory process is a visible and pretty fair index to that of the biliary, so every precautionary measure, which keeps in check, or moderates the profusion of the *former* discharge, will invariably have the same effect on the *latter*, and thus tend to obviate the inconvenience, not to say the disorders, arising from redundancy of the hepatic secretion. To this rule I do not know a single exception; consequently its universal application can never lead astray in any instance. But this subject will be better elucidated, and more clearly explained hereafter.

To proceed. It is well known, without having recourse to Brunonian doctrines, that if any organ be stimulated to *inordinate* action, one of two things must in general ensue. If the cause applied be constant, and sufficient to keep up, for any length of time, this *inordinate* action, serious injury is likely to accrue to the organ itself, even so far as *structural* alteration. But if the cause be only temporary, or the force not in any great degree, then an occasional torpor, or exhaustion, as it were, of the organ takes place, during which period its *function* falls short of the natural range. To give a familiar example, of which too many of us are quite competent to judge:—thus if the stomach be goaded to immoderate exertion to-day, by a provocative variety of savoury dishes and stimulating liquors, we all know the atony which will succeed to-morrow, and how incapable it then will be of performing its accustomed office. It is the same with respect to the liver. After great excitement, by excessive heat, violent exercise in the sun, &c. a torpor succeeds, which will be more or less,

according to the degree of previous excitement, and the length of time during which the stimulating causes have been habitually applied. For instance, when Europeans first arrive between the tropics, the degree of torpor bears so small a proportion to that of preceding excitement, in the liver, that it is scarcely noticed; particularly as the debilitated vessels in this organ, *continue* (similar to the perspiratory vessels on the surface) to secrete an imperfect fluid for some time *after* the exciting cause has ceased; hence the *increase* of the biliary secretion occupies our principal attention. But these torpid periods, however short at first, gradually and progressively increase, till at length they far exceed the periods of excitement; and then a *deficiency* of the biliary secretion becomes evident. This is not only consonant to experience, but to analogy. Thus, when a man first betakes himself to inebriety, the excitement occasioned by spirits, or wine, on the stomach and nervous system, far exceeds the subsequent atony, and we are astonished to see him go on for some time, without, apparently, suffering much detriment in his constitution. But the period of excitement is gradually curtailed, while that of atony increases, which soon forces him not only to augment the dose, but to repeat it oftener and oftener, till the organ and life are destroyed!

Now it is somewhat singular, that this alternation of redundancy and deficiency, or, in other words, *irregular* secretion in the biliary organ, should pass unnoticed by writers on hot climates. They, one and all, represent the liver as a colossal apparatus, of the most Herculean power, that goes on for years, performing prodigies in the secreting way, without ever being exhausted for a moment, or falling *below* the range of ordinary action, till structural derangement, such as scirrhosity or tuberculation, incapacitates it for its duty! A very attentive observation of what passed in my own frame, and those of others, has led me to form a very different conclusion; and the foregoing statement will, I think, be found a true and natural representation of the case. I shall afterwards shew, that the secretion in question is frequently below *par*, in quantity, at the very time when it is considered to be redundant—all arising from irregularity and vitiation.

Here, then, we have two very opposite states of the liver and its functions. 1st, inordinate action, with increased secretion—the periods gradually shortening. 2d, torpor of the vessels in the liver, with deficient secretion—the periods progressively lengthening. In both cases, the bile itself is *vitiated*. We may readily enough conceive how this last comes to pass, by an analogical comparison with what takes place in the stomach during, and subsequent to, a debauch. In both instances, we may conclude, that the chyme passes through the pylorus into the duodenum, in a state less fit for chylification, than during a season of temperance and regularity.—So, during the increased secretion, and subsequent inactivity in the

liver, the bile passes out into the intestines deteriorated in quality, as well as superabundant or deficient in quantity.

In what this vitiation consists, it is certainly not easy to say. In high degrees of it, attendant on hurried secretion, both the colour and taste are surprisingly altered; since it occasionally assumes all the shades between a deep bottle green and jet black; possessing, at one time, an acidity that sets the teeth on edge; at other times, and indeed more frequently, an acrimony that seems absolutely to corrode the stomach and fauces, as it passes off by vomiting, and when directed downwards, can be compared to nothing more appropriate than the sensation which one would expect from boiling lead flowing through the intestines. Many a time have I experienced this, and many a time have my patients expressed themselves in similar language. The slightly disordered state of the hepatic functions, which we are now considering as primary effects of climate, and within the range of health, may be known by the following symptoms:—Irregularity in the bowels, with motions of various colours, and fetid, or insipid odour;—general languor of body and mind; slight nausea, especially in the mornings, when we attempt to brush our teeth; a yellowish fur about the back part of the tongue; unpleasant taste in the mouth on getting out of bed; a tinge in the eyes and complexion, from absorption of bile; the urine high coloured, and a slight irritation in passing it; the appetite impaired, and easily turned against fat or oily victuals,—irritability of temper—dejection of mind—loss of flesh—disturbed sleep. These are the first effects, then, of increased and irregular secretion of bile, and will appear in all degrees, according as we are less or more cautious in avoiding the numerous causes that give additional force to the influence of climate. For example: if I use more than ordinary exercise—expose myself to the heat of the sun—or drink stimulating liquids to-day, an increased and vitiated flow of bile takes place, and to-morrow produces either nausea and sickness at stomach, or a diarrhœa, with gripings and twitchings in the bowels. But a slight degree of inaction or torpor succeeding, both in the liver and intestines, there will probably be no alvine evacuation at all, the ensuing day, till a fresh flow of bile sets all in motion once more. These irregularities, although they may continue a long time without producing much inconvenience, especially if they be not aggravated by excesses, yet they should never be despised, since they, inevitably, though insensibly, pave the way for serious derangement in the biliary and digestive organs, especially in hot climates, unless counteracted by rigid temperance, and the prophylactic measures which I shall carefully detail in the proper place. The reciprocal influence and effects which the hepatic and mental functions exercise on each other, will form an interesting inquiry under the article Hepatitis.

Sect. V.—Among the primary effects of a hot climate (for it can hardly

be called a disease) we may notice the prickly heat (Lichen Tropicus) a very troublesome visitor, which few Europeans escape.

This is one of the miseries of a tropical life, and a most unmanageable one it is. From mosquittoes, cock-roaches, ants, and the numerous other tribes of depredators on our *personal* property, we have some defence by night, and, in general, a respite by day; but this unwelcome guest assails us at all, and particulary the most unseasonable hours.

The sensations arising from prickly heat are perfectly indescribable; being compounded of pricking, itching, tingling, and many other feelings, for which I have no appropriate appellation. It is usually, but not invariably, accompanied by an eruption of vivid, red pimples, not larger, in general, than a pin's head, which spread over the breast, arms, thighs, neck, and occasionally along the forehead, close to the hair. This eruption often disappears, in a great measure, when we are sitting quiet, and the skin is cool; but no sooner do we use any exercise that brings out a perspiration, or swallow any warm, or stimulating fluid, such as tea, soup, or wine, than the pimples become elevated, so as to be distinctly seen, and but too sensibly felt!

Prickly heat, being rather a symptom, than a cause of good health, its disappearance has been erroneously accused of producing much mischief; hence the early writers on tropical diseases, harping too far on the old string of "humoral pathology," speak very seriously of the danger of *repelling*, and the advantage of "encouraging the eruption, by taking small warm liquors, as tea, coffee, wine whey, broth, and nourishing meats."—*Hillary.*

Even Dr. Moseley retails the puerile and exaggerated dangers of his predecessor. "There is great danger" (says he) "in repelling the prickly heat; therefore cold bathing and washing the body with cold water, at the time it is out, is always to be avoided." Every naval surgeon, however, who has been a few months in a hot climate, must have seen hundreds, if not thousands of the ships' crews, plunging into the water, for days and weeks in succession, covered with prickly heat, yet without bad consequences ensuing.

Indeed, I never saw it even repelled by the cold bath; and in my own case, as well as in many others, it rather seemed to aggravate the eruption, and disagreeable sensations, especially during the glow which succeeded the immersion. It certainly disappears suddenly sometimes on the *accession* of other diseases, but I never had reason to suppose, that its disappearance *occasioned* them. At the same time, I would not advocate cold bathing or repellent applications to this eruption, unless the individual was otherwise in good health. Where there is any weak organ in the body, or any constitutional tendency to disease, the repulsion of any eruption, by any means whatever, is to be avoided. But this precaution can hardly apply to the present case, as I am particularly alluding to the primary effects of a hot climate on people recently arrived from a northern latitude. I have tried

lime-juice, hair-powder, and a variety of external applications, with little or no benefit. In short, the only means which I ever saw productive of any good effect in mitigating its violence, till the constitution got assimilated to the climate,—were light clothing—temperance in eating and drinking—avoiding all exercise in the heat of the day—open bowels—and lastly; the use of the punkah, or large fan, during the night, as is now the common practice in Bengal. The punkah is always safe; and, unlike the thorough draught or external breeze, it removes the heated air surrounding the body, without exposing it to the dangers arising from the sudden night changes in the temperature and humidity of the atmosphere.

J. J.

SKETCH OF THE PHYSICAL CLIMATE OF CALCUTTA IN BENGAL.

"L'ensemble de toutes les circonstances naturelles et physiques, au milieu desquelles nous vivons dans chaque lieu."—CABANIS.

"The best observations upon climate often lose half their value from want of an exact description of the surface of the country."—MALTE-BRUN.

WHOEVER considers climate, with reference to its vast importance to human welfare, must feel some degree of disappointment at the meagreness in which the advanced state of knowledge in the nineteenth century has yet left this most interesting branch of inquiry. One philosopher will view climate as any space distant from the equator and poles; another, as nothing more than a well-arranged table of the winds, of the thermometric, barometric and hygrometric, degrees; a third, as having reference solely to elevation above the mean level of the earth's surface; a fourth, as consisting only of the internal heat of the globe; while a fifth, supposed to be better informed than all the rest, pronounces climate to be influenced only by latitude and local elevation, and allows it to be but slightly affected by any other causes. We may, then, with some shew of reason exclaim with Dr. A. T. Thomson, what is climate?

That such partial views are unequal to the elucidation of the subject of climate, will at once be apparent by reference to the common geographical fact, of two places in the same elevation and degree of latitude possessing climates the most opposite. We must then, look for the causes of climate elsewhere; and however much those may be influenced by elevation and latitude, we shall find other and powerful accessories which greatly influence health, and consequently human happiness. He must be a bold, if not a presumptuous man, however, who shall pretend to do full justice to a subject so elaborate, and which demands the application of such refined principles in physical science as climate; yet, I cannot help thinking that much that is important may be done, by a careful observation and comparison of facts, made at different times and places; for, it is by such means that a science like that of climate can alone be perfected.

Whether we view the subject in a physical or medical sense, we shall do well to carry along with us the maxim of Professor Adam Fergusson, "that all observation is suggested by comparison." The value of all scientific facts depends in a great measure on their being comparable, and this in an especial manner applies to inquiries relating to climate and medical statistics. I am satisfied that in a professional sense, it is impossible to take too extended a view of the subject of climate, and that he who succeeds best must follow the indication of Cabanis—"l'ensemble de toutes les circonstances naturelles et physiques, au milieu desquelles nous vivons dans chaque lieu;"—for this much is certain, that the framers of elaborate tables of the winds and of the degrees of the thermometer, have as yet done little either to inform our minds, or guide our inquiry.

Medical men, to whom a right understanding of the subject is paramount, are happily beginning to be aware of this fact, and it is with much satisfaction I find one of the latest writers on medical topography in England declaring, that the character of a climate is much more faithfully indicated by such a natural test as its influence on vegetable products, " than by any instrumental, or artificial, means whatever."

Dr. Mason Good asserts, with truth, that it is no exclusive reproach to medicine that meteorology has hitherto been turned to so little practical advantage; " for of all the subdivisions of general philosophy, there is none so little entitled to the name of science as meteorology itself. And, till the naturalist has explained the variations of the barometer, the physician need not blush at being incapable of turning to account the supposed influence of the planets, or unfolding the origin, or tracing the capricious courses of epidemics and pestilences."

Malte-Brun's division of physical climate shall here be adopted, because it marks the points to which our inquiries may most profitably be directed, inasmuch as a consideration of the details, as given by that admirable writer, brings us at once to the discovery of such errors in the physical condition of any given place, as may lead to its improvement, and the consequent prevention of disease—the great end of medical topography. When again, we look back to our native country, and boast of its pure and bracing air, let us not forget the all-important fact, " that it is man himself who has in a great measure created these salubrious climates. France, Germany and England, not more than twenty ages ago, resembled Canada and Chinese Tartary, countries situated, as well as our Europe, at a mean distance between the equator and the pole."

" Whenever nature is more powerful than industry, whether for good or for bad, man receives from the climate an invariable and irresistible impulse;" and so it is here in Bengal, "*for bad,*" in consequence of the total absence of that " industry," which elsewhere moulds nature to the purposes of man, for his " good."

Physical climate, says Malte-Brun, comprehends the degree of heat and cold, the drought, the humidity, and the salubrity which occur in any given region of the earth.

The causes of physical climate he states to be nine in number:—

1st. The action of the sun upon the atmosphere.

2nd. The interior temperature of the globe.

3rd. Elevation of the earth above the level of the ocean.

4th. The general inclination of the surface and its local exposure.

5th. The position of its mountains relatively to the cardinal points.

6th. The neighbourhood of great seas and their relative situation.

7th. Geological nature of the soil.

8th. Degree of cultivation and of population at which a country has arrived.

9th. The prevalent winds.

To these may perhaps, be added—

10th. Position in respect to the equator.

11th. Position in respect to large rivers or lakes,

12th. Position in respect to forests.

By tracing these causes, and by uniting and arranging under general points of view, the results of particular local observations, we shall, according to Malte-Brun, arrive at an approach to *climatology*, in some measure corresponding to the present state of the other sciences.

ACTION OF THE SUN UPON THE ATMOSPHERE.

At all places between 20° and 23½° of latitude, the solar rays during two months fall at noon either perpendicularly, or at an angle which deviates from a right angle only by 3½° at most. The degree of temperature is also increased by the greater length of the longest days, which, near the tropic, are 13½ hours. The application of these facts to the geographical position of Calcutta during portions of May, June, July and August, are sufficiently obvious, and would not seem to require the lengthened details offered by some writers.

The difference between sensible heat and that indicated by instruments, is nowhere more remarkable than within this city during the hot months, when, from the length of time the houses, walls, and roads are getting heated by the sun, the first hours of the nights are rendered even more oppressive than the day, from the copious radiation going on for some time after the sunset. "The true indication of the force of the solar rays would seem to be, *not* the statical effect upon the thermometer, but their momentary intensity measured by the velocity with which they communicate heat to an absorbent body."—*Sir J. Herschel.*

Chowringhee and Garden Reach have a perceptible advantage over Calcutta, from their openness and the great extent of evaporation from trees, which tends so much to reduce temperature.

This delightful property in trees should always be turned to our advantage; and where the grounds are kept in proper order, a moderate number of trees will prove grateful and beneficial in every sense, but especially in the hot dry season.

In the rains, the evaporation from trees can add but little to the humidity already existing in the atmosphere. It has been computed that a country covered with trees emits more vapour by one-third, than one even covered with water, and it is this property that gives to the shade of vegetables a coolness so much more effectual and agreeable than that of rocks or walls.

In the sweeping condemnation by that clever writer, Dr. M'Culloch, of trees, &c., down to the very flower-pots, he goes a length unwarranted by

any known facts. It is surely unphilosophical to view every thing in nature as made only for man's destruction.

The following table will exhibit the state of the atmospheric temperature here, its weight and humidity, during the years specified. The thermometer in the open air is found to vary from 40° to 110° in Calcutta.

		Maximum.	*Minimum.*	Remarks.	
1830	Therm. ..	90°.... 4	53°.... 3		During these years the observations were registered four times a day, at sun rise, 10 A.M., 4 P.M. and 10 P.M., hence the variations of maximum minimum are greater.
	Barom. ..	30 131	29 512	Mean Barometer.	
	Hygrom...	16 9	1 5	Wet bulb depression	
1831	Therm. ..	95°.... 8	57°.... 8		
	Barom. ..	30 122	29 456		
	Hygrom...	14 5	1 5		
1832	Therm. ..	96°.... 9	54°.... 6	Mean Barometer.	
	Barom. ..	30 071	29 467	29°.....764	
	Hygrom...	15 2	1 6		
1833	Therm. ..	97°.... 2	61°.... 1		
	Barom. ..	30 095	29 485	Mean temperature.	
	Hygrom...	17 3	2 3	78°	
1834	Therm. ..	99°.... 4	58°.... 9		
	Barom. ..	30 022	29 470		
	Hygrom...	13 8	1 4		
		In the Sun.	On the ground		
1835	Therm. ..	110°.... 2	42°.... 0		Observations only registered at 10 A.M. and 4 P.M.
	Barom. ..	30 038	29 480		
	Hygrom...	13 9	3 . .. 2		
		May	January		
1836	Therm. ..	97°.9.. ..	53°.... 5		
	Barom. ..	Jan. 30.087	Aug. at 9 h.50 29.569		
	Hygrom...	March 14.8	August 5.6		
1837	Therm. ..	June 98.2	not absd.	Each entry is the	
	Barom. ..	Jan. 31.101	July 29.547	average of a month's	
	Hygrom...	April 20.4	July, Aug. 4.2	observations.	

The mean temperature of each month in Calcutta, may be seen by the annexed Table :—

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
66°·2	69°·8	80°·0	85°·4	85°·7	83°·7	81°·8	82°·0	82°·0	79°·2	74°·2	66°·6

The greatest range of temperature takes place in December and January, when it amounts to about 18°, the least range is in July, when it is about 6°. The mean hour of minimum temperature for the year is about sun rise :—that of maximum temperature, 2.40 P.M.

INTERNAL HEAT.

Some philosophers have sought the cause of climate in the internal heat of the globe. The subject has engaged the attention of scientific men in various countries, but it is only of late that any thing approaching to precise information has been obtained. From experiments recently made, it would appear to be ascertained, that in proportion to the depression below the earth's surface, so does the temperature steadily increase; and even when the depths were very small the elevation was quite perceptible.

It is stated on the other hand, by Fourier, that at 100 feet below the surface the influence of the solar rays is extinct. The position where this takes place he calls the invariable stratum; all variations above this place are imputed to the influence of radiation, all below to the native or primeval heat of the globe.

A successive influx and efflux of heat is constantly going on in the strata above that of invariability. The heat of the solar rays is constantly acting on it during the day, and with an intensity depending upon the absorbent power of the surface, and the latitude.

The temperature of seas and lakes being much below that of continents, the inference is that in Summer the atmosphere which is in contact with the masses of water must always be less heated than that portion of it which is contiguous to the earth. From an experiment of Professor Phillips we find that in a mine 525 yards below the surface, the temperature was 78° Fahrt., while the mean temperature of the place was $47\frac{1}{2}°$. The temperature in the caves below Paris is constantly between 52° and 54° of Fahrt.; while at the surface the difference between Summer and Winter exceeds 90°. At the bottom of Joseph's well, Cairo, lat. 30°, at the depth of 210 feet, the thermometer stands at 70°. In the mines of Mexico, lat. 20°, at a depth of 1650 feet, it is $74\frac{3}{4}°$, appearing to augment in approaching the Equator.

The mean results of the temperature of six mines in Cornwall was found as follows:

Depth in feet.	*Mean Temperature.*		*Remarks.*
	Air.	*Water.*	
200 to 250	50	56	From a point 200 feet below the surface, the temperature was found by Dr. Forbes to increase about one degree for every 50 or 60 feet of descent.
400 — 450	61	54	
800 — 850	66	66	
1350 — 1400	83	79	

A scientific friend informs me that at Bombay, he found the temperature near the surface in the cold season to be 82°, and at Poonah 78°. The temperature at great depths, I have not been able to ascertain. At a depth of 75 feet 3 inches in Fort William, the thermometer stood at 82°, while above ground, it ranged in the shade at about 76°.

ELEVATION OF THE GROUND.

When we consider the accuracy and extensive knowledge we have arrived at in the position of points of interest on the surface of the globe, with regard to the co-ordinates of latitude and longitude, and how little has been done for the third co-ordinate of elevation, we shall have a field before us, open to cultivation in many parts of our empire, and of the greatest interest within the Tropics.

With the elevation of the land, cold increases in a very rapid progression, being caused by the enlarged capacity which air acquires by rarefaction.

The rate of increase of cold is one degree for every hundred yards of altitude; and this beneficent appointment of nature considerably increases the number of habitable countries in the Torrid Zone: "In ascending from Bengal to Thibet, we imagine ourselves in a few days transported from the Equator to the Pole."

The site of Calcutta is said to be, on the average, but little, if at all, above the level of the tides at Saugor; in the diplomatic language of Asia, "what more need I say," as to the choice of our position!

GENERAL AND LOCAL ASPECTS.

The general aspect should be distinguished from the local aspect. The general declivity of a country, large in itself, does not exclude the most opposite local declivities. It may, however, be admitted as a general principle, that the positive sum of all the local aspects is in the same direction as the general aspect.

This principle can only be applied to spaces of great extent; for example, the entire tract of country through which a river flows. Every one knows of what effect as to temperature, is the exposure of a soil relatively to the sun. A hill inclined 45 degrees to the south, when the sun is elevated 45 degrees, receives solar rays perpendicularly, whilst upon a plain the same rays strike the soil under an angle of 45 degrees, that is, with one quarter less of force; and a hill inclined 45 degrees to the north, will be struck by the solar rays in a horizontal direction, which makes them glide along its surface.

Malte-Brun, speaking of the northern hemisphere, says that the *south-south-west* and *south-west* situations are the warmest of all;—whilst on the contrary, those of the *north-east* are the coldest. The general aspect of

the valley of the Ganges is about east and west, with an inclination of the delta to the south.

POSITION OF MOUNTAINS.

Mountains act on climates in two ways. They attract the vapours suspended in the air; these vapours, by their condensation, produce clouds and fogs—often also, these assemblages of watery substances, which the winds waft in every direction, are stopped in their devious course by chains of mountains, in the elevated valleys of which they continue to accumulate. These effects are still more sensibly felt, when a chain of mountains is crowned with extensive forests.

The elevated lands in Bengal merit the name of inequalities more than hills, and are mostly situated in the districts of Bheerboom, Sylhet, Chittagong, and along the eastern boundaries of Tipperah. They are limited in extent, and exert little or no influence on our climate.

EFFECTS OF THE NEIGHBOURHOOD OF THE SEA.

The neighbourhood of the sea moderates the excess of temperature, besides contributing, according to Pouillet, through evaporation, one of the most important sources of atmospheric electricity.

In hot climates the maritime regions are not so warm as the centre of the plains;—of this we have an annual example in the marine current of the south-west monsoon.

Calcutta is situated about a hundred miles from the sea, but so level is the country that the tides ascend in the dry season as far as Sooksagur, being 140 miles from Saugor Point.

In the beginning of March, when the S.W. monsoon sets in, the currents set up the Bay of Bengal, and gradually raise the sea at its head several feet, raising the river Hooghly with it, and that long before the freshes are felt. This continues till October, when the pouring of the rivers into the Bay, during the rains in July, August and September, and the change of the monsoon to N.E. in the end of October, give the current a set in the contrary direction, and gradually restore the sea and river to their condition in the previous March. The effect of the two monsoons upon the currents, and the height of the sea in the Bay of Bengal, may therefore be considered, as that of two long unequal tides during the year,—eight months of flood and four of ebb. From the point of lowest low water in the dry season to that of the highest high water in the freshes, is twenty feet ten inches.

The greatest mean rise of the tide, from low to high water mark in the freshes, is ten feet. The smallest mean rise of the tide in the dry season, neap tides, is four feet. The bores in the Hooghly occur only in the highest,

or alternate spring tides; their appearance may with certainty be predicted by the season of the year and the parallax of the moon. They are greatest under the influence of the S.W. monsoon, and are only felt in those portions of the river where the peculiar form of the sands, and the direction and set of the tides in any particular reach actuate their rise.*

Persons who speak confidently, and enter into minute details on the tides and levels, assert that we are only protected from irruptions of the sea, by the counter currents of the rivers, and the friction of the tides against their banks. They state the tides in the Salt Lake to be but two feet above the mean level at Saugor, and consequently several feet at flood tide, below that at Saugor. Of the truth of some of these assertions we had a calamitous illustration on the 20th and 21st May, 1833; when the sea, backed by a storm from the E.S.E. and S.E. overran the low countries along the coast from Balasore along Hidgelee and up to Tumlook and Diamond Harbour, making a breach over the Sunderbund as far north as Calcutta, and extending its devastations as far east as Dacca. There have been many irruptions of the sea within fifty years, but none to equal this last in violence and extent. For some days the barometer stood at 28 inches and 8 decimals, being lower than it had been known for years, the thermometer averaged 84°.

The tide, which ran for seven hours, rose to a height of 12 feet above its ordinary level, destroying embankments and buildings of every kind, while the storm levelled the trees; nothing stood within the influence of tide and wind, and the loss of human life and destruction of cattle must have been enormous.

Saugor Island was covered seven feet deep; and out of a population of 7,000 persons, few escaped. The rains were nearly a month later than usual in setting in, and the ordinary cultivation was arrested from the saturation of the soil with salt. The starving survivors from these united calamities crowded about the outer Suburbs of Calcutta, and were at last reduced to the necessity of supporting the parents' lives by the wretched and unnatural trafic in their children, the most emaciated of whom sold at last *for one rupee*. Government did much to relieve the more pressing necessities of these poor people; but there was much that no power could relieve. Towards the end of August, there broke out a severe epidemic fever, which by the end of September and during the drying process, ripened into terrible violence—carrying off, according to the reports of respectable natives, nearly three-fourths of the remaining population to the south and east of us. Neither did Calcutta escape; thousands of the natives died, particularly in the Suburbs, nearest the land inundated in May;—even the Europeans suffered severely, though there were not many casualties.

In reference to the influences spoken of at the commencement of this

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* Vide the interesting paper by Mr. Jas. Kyd, Trans. A. Society, from which the above is collected.

article, I would call attention to a subject of much interest in a practical and scientific point of view, and which has recently been brought to the notice of the authorities of the Admiralty by Professor Daniell, of King's College, London—namely, the existence of an extraordinary impregnation with sulphuretted hydrogen of the waters of the ocean, and of the embouchures of the rivers along the coast of Africa, through an extent of more than sixteen degrees of latitude.

Two sources are supposed by the Professor to which this excessive impregnation may be referred—namely, first, a submarine volcanic action, in which case the evolution might be considered direct or primary; and, secondly, a re-action of vegetable matter upon the saline contents of the water, in which case it would be secondary.

Mr. Malcolmson, in an able memoir lately printed in the Geological Transactions, says, that he has observed "the same phenomena in the salt water of inlets along the Indian coast, wherever the bottom contained argillaceous and carbonaceous matter," and he ascribes the effect to "the decomposition of the sulphates in the water by the carbon, and the clay only prevents its passing off into the air, or mixing with the water by the power of adhesion." Professor Daniell goes on to say that, "decayed vegetable matter abstracts the oxygen from sulphate of soda, and a sulphuret of soda is formed. This again, acting upon water, decomposes it, and sulphuretted hydrogen is one of the products of the decomposition." * * "I feel more than ever convinced, that the evolution of sulphuretted hydrogen is intimately connected with the unhealthiness of such stations,"—meaning the mouths of most of the rivers on the Western Coast of Africa, where extensive mud banks are supposed to be formed, consisting chiefly of vegetable detritus, in the exact state which is most favourable to the actions described. "This view rests upon experimental evidence, and upon considerations of great cogency, derived from the unhealthiness of certain well-known situations, in which decaying matters from tropical vegetation are brought into contact with sea water."

"The peculiar unhealthiness of mangrove swamps, in all parts of the world, I have little doubt, arises from that tree requiring salt water for its growth, and its decaying foliage being thus brought into immediate contact with the sulphates. The hypothesis also agrees with the fact (which I believe has been established) that the unhealthiness of such situations does not extend to any considerable distance from the sea."

"It has been experimentally found, that so small a mixture as a fifteen-hundredth part of sulphuretted hydrogen in the atmosphere, acts as a direct poison upon small animals, and the sensations of languor and nausea, described by Mr. Laird, are exactly those which have been experienced by persons who have been exposed to the deleterious influence in small quantities."

The subject is one of great interest and importance, and cannot fail to engage the attention of the tropical practitioner.

GEOLOGICAL NATURE OF THE SOIL.

The internal nature of the soil must have an influence on climate in a variety of ways. All grounds are not heated equally soon. One soil quickly parts with its acquired heat, while another retains it for a long time. Exhalations, which vary according to the nature of the soil, rise into the atmosphere, and become identified with it. Clayey grounds, and those which are impregnated with salt, cool the atmosphere; extensive accumulations, when they are dry, augment the heat. The general soil of Bengal is clay, with a considerable proportion of silicious sand, fertilized by various salts, and by decayed substances, animal and vegetable. Both the upper and sub-soil are generally pervious to water, but on an average depth of 20 feet is found a tenacious clay: at this depth too, brackish water is found. In sinking wells in the vicinity of Calcutta, no springs of fresh water were reached at a depth of 470 feet.

In the old Magazines and Newspapers printed in Calcutta, I find very frequent mention of earthquakes; but in none of these does there seem to have been any material injury sustained, which looks as if the causes were remote from us. Of the surpassing fertility of the soil—" the work of the Ganges "—nothing need here be said; it has been the theme of admiration of all travellers from the earliest times; and, according to Bernier, gave rise to this proverb amongst the Portuguese, English, and Hollanders, viz. that there are an hundred open gates to enter into the kingdom of Bengal, and not one to come away again.

INFLUENCE OF THE LABOUR OF MAN—GENERAL POPULATION.

Without cultivation, few climates would be salubrious or agreeable, and it is by its means that man exercises so powerful an influence upon the temperature of the air.

Let us contemplate a desert country, the rivers, abandoned to themselves, become choked and overflow, and their waters serve only to form pestilential marshes. A labyrinth of thickets and of brambles overspread the most fertile hills. In the meadows, the unsightly wild mushroom, and the useless moss choke the nutritious herbs; forests become impenetrable to the rays of the sun; no wind disperses the putrid exhalations of the trees which have fallen under the pressure of age; the soil, excluded from genial and purifying warmth of the air; exhales nothing but poison; and an atmosphere of death gathers over all the country. But what do not industry and perseverance accomplish? The marshes are drained; the

rivers flow in their disencumbered channels; the axe and the fire clear away the forests; the earth furrowed by the plough is opened to the rays of the sun and the influence of the wind; the air, the soil, and the waters acquire by degrees a character of salubrity; and vanquished nature yields its empire to man who thus creates a country for himself.

Agriculture must be much improved in Bengal before the European, in the language of Malte-Brun, can be said to have created a country for himself. A Hindoo field is described by Mill to be in the highest state of cultivation, where only so far changed by the plough, as to afford a scanty supply of mould for covering the seed, while the useless and hurtful vegetation is so far from being eradicated, that where burning precedes not, the grasses and steriles which have bid defiance to the plough, cover a large portion of the surface. The same author concludes that "every thing which savours of ingenuity, even the most natural results of common observation and good sense, are foreign to the agriculture of the Hindoos"—"Their ideas of improvement are very limited; they scarcely extend beyond the introduction of irrigation into land which was formerly cultivated dry. Each small proprietor is content to follow the customs of his forefathers; the same rude implements of husbandry, the same inferior race of cattle, and the same practices are still in operation, which have existed unchanged for centuries. As to any new experiments of general measuring, draining, differences in the rotation of crops, introducing new grain or vegetables, or new sorts of those already known, any attention to their breed of cattle, any adoption of a better and more combined system by which a smaller number of people could raise the same or a larger proportion of produce,—all these are out of the question." I cannot find that the example of European superiority has had much influence on the state of agriculture around the metropolis. It is certain that in the cold season the markets are supplied with excellent vegetables of every kind; but beyond this I believe matters are much the same as in the days of Job Charnock. The general crops are of rice. In the appendix to the Parliamentary Reports of 1831, I find the population of the 24-Pergunnahs, Suburbs, and City rated at 1,225,000, which I have reason to think is over-estimated.

THE PREDOMINANT WINDS.

The united influence of all the elements which constitute physical climate is variously modified by the prevailing winds; and all their variations depend on the equilibrium of the atmosphere, the heat of one climate and the cold of another exercising a continual influence on each other.

The northern parts of a great continent will sometimes send forth their cold air towards the southern parts; and sometimes they will receive warm air in return. The monsoon always changes sometime after the equinoxes,

and constantly blows towards that hemisphere in which the sun is found.

The action of this luminary on the atmosphere, is therefore plainly one of their causes—the cold air from the mountains of Thibet following its course for half the year, and that from the southern seas during the other.

The south-west rainy monsoon, the most remarkable of our periodical winds, begins on the Malabar Coast in May, and reaches Delhi by the end of June, extending to the north-eastern parts of Afghanistan, but greatly modified. It prevails more in the mountains than the flats of the Punjaub: —the hills and valleys of Cashmere have their share of it, and it gradually loses itself westward in the valley of Peshawur, where it appears only in clouds and showers. On the Coromandel Coast it is retarded, the clouds brought by the S. W. winds being detained by the Ghauts. It reaches Bengal by the 15th June.

Owing to the arrest of the S. W. monsoon by the mountains, and consequent accumulation of vapour, an extraordinary deposition of rain takes place on the Malabar Coast, being not less than 123-5 inches in the year in the latitude of $11\frac{1}{2}$ N.

When not influenced by elevated lands, this monsoon generally prevails north of the equator from April to October, accompanied by tempests, storms and rain, while a north-east wind blows during the other six months. The periodical winds that prevail in the Bay of Bengal extend their influence over the flat country, until they are diverted by chains of mountains into another direction, nearly correspondent, however, with the course of the Ganges. When the sun has passed into the southern hemisphere, the monsoon alters its direction; the mass of air which had been accumulated during the hot season and rains on the central platform of Asia, now bestirs itself, and moves towards the regions south of the equator, where the atmosphere has been dilated and dissipated by the solar heat. Over most parts of the Indian Ocean, this monsoon proceeds from the north-east, because the central platform lies to the north-east. On the other hand, as the seas of China, of Borneo, of New Guinea, of Java, have the centre of Asia to the north and north-west, the monsoon comes to them from these points.

In the south of Bengal, the prevalent winds are north and south; in Behar east and west, and the same takes place in Assam, following the course of the Berhampooter.

That the monsoons exercise a beneficial influence on health cannot be doubted, but especially the south-west, from its prevalence during the greatest heats, and from its greater power of thoroughly ventilating the country. Stagnation would prove immediately destructive to health in a climate where there are so many various and abundant sources of noxious effluvia, to ripen into activity by such a cessation of wind as should admit

of their accumulation and that of heat, in any one place or in such streets, for instance, as those of the native portion of Calcutta. Of the N. E. monsoon I must limit my praises solely to its ventilating properties; for in every other respect, it exercises an unfavorable influence on health to a degree not generally known; indeed, so far from it that it is common to hear the accession of the cold season hailed by invalids who are ignorant of the many dangers it carries along. It is the true "Sirocco of the North." The following Table gives the direction of the winds at noon during the years specified.

Table of Winds at noon during the years 1832-8.

	N.	NW.	W.	SW.	S.	S.E.	E.	N.E.	Calm	
	Days	Days	Days	Days	Days	Days	Days	Days	Days	
In 1832 the wind was	44	60	26	44	67	49	4	71	9	No regist. 1 day.
,, 1833 ,, ,, ,,	56	39	14	30	115	24	25	32	29	Ditto do. 2 days.
,, 1834 ,, ,, ,,	53	52	12	25	99	22	26	40	36	
,, 1835 ,, ,, ,,	41	65	31	84	41	45	12	31	7	Ditto do. 8 days.
,, 1836 ,, ,, ,,	67	58	88	38	46	7	23	20	12	Ditto do. 6 days.
,, 1837 ,, ,, ,,	83	26	77	43	76	6	21	13	7	Ditto do. 3 days.
,, 1838 ,, ,, ,,										
Total	344	300	248	264	444	153	111	207	100	

THE RAINS—SOURCES OF AQUEOUS EXHALATIONS—HUMIDITY.

The eudiometric processes having failed of discovering in the atmosphere of places the most opposite, such as the narrow lanes of London and the summits of lofty mountains, any difference in the constituent properties of their permanent gases, it becomes a question of the highest interest and importance to ascertain the varying quantity of aqueous vapour in our atmosphere; for it is the only fluctuating ingredient in its composition. To the medical topographer, a minute inquiry of the kind stated may lead to a knowledge interesting and important respecting the causes and cure of certain diseases, in so far as these may be connected with climate, and this is no small benefit from the proper application of instruments.

Without taking into view the expanse of the Bay, the coup-d'œil of a good map of Bengal will at once shew how bountiful nature has been to that country, by means of her majestic rivers with their innumerable tributaries, in yielding the sources of aqueous exhalations, and it were gratifying to the medical topographer, could his description be limited to these. There are not any lakes in Bengal resembling those of Scotland, or Canada, but there is a profusion of extensive jheels, which may be either denominated shallow lakes or morasses. A large proportion of these in the dry season contain little or no water, but during the rains present immense sheets, over which

boats of the greatest magnitude may be navigated, and some are navigable a certain extent throughout the year. There is reason to believe that nearly all these stagnant sheets of water rest in what were at a remote period the channels of large rivers, which have since altered their courses and now flow in another direction. The area of Bengal and Behar is 149,217 square miles, and with Benares not less than 162,000 square miles. The following proportions of the surface are grounded upon many surveys after making allowance for large rivers:

	Parts.
Rivers and lakes (one-eighth), ...	3
Deemed irreclaimable and barren (one-sixth)	4
Sites of towns and villages, highways, tanks, &c. (one twenty-fourth)	1
Free land (three twenty-fourths) remain liable to revenue.. ..	3
In tillage (three-eighths)	9
Waste (one-sixth), ...	4
Total	24*

According to another calculation Bengal contains 97,244 square miles: if from this, that portion of Tipperah which is independent, the tract of the Sunderbunds and other wastes, equal to 13,244 square miles, be deducted, the remaining inhabited country will be equal to 84,000 square miles; but the extent of waste and surface occupied by rivers, marshes, &c., seems here greatly under-rated.

When all this is considered, along with the complete saturation during five months in the year, of every inch of soil, even that which may not be actually inundated, the extent and sources of aqueous exhalation—the commerce of land and water—may be imagined. It is ascertained that the capacity of the atmosphere for moisture varies with its temperature, so that at 113°, it holds a twentieth part of its weight of moisture; at 80° a fortieth, and so on.

To a scientific officer well acquainted with the localities, I put the two following questions: 1st. Taking the area of the 24-Pergunnahs to be 882 square miles, what proportion should you say the water surface bears to the land, on the 30th May and the 10th of October, the first being just before the rains, and the latter just after? 2d. What proportion does the cultivated land bear to the waste and jungle within the said area?

Answer to 1st question.

I should say that, on the 10th of June, you might assume one-twentieth part as the proportion of the water to the land;—of course I mean by water, ground from which exhalations could arise.

* W. Hamilton.

Answer to question 2d.

The cultivated land may be about 14-20ths; water, 1-20th; roads and villages, 2-20ths; uncultivated, 3-20ths.

The subjoined Table will shew the annual fall of rain during the years specified—the average annual fall is about 60 inches.

RAIN.

1830	63·28
1831	57·50
1832	49·26
1833	60·56
1834	68·73
1835*	85·50
1836	45·39
1837	43·6
1838	
Mean....	59·228

The following are the average rates of evaporation for the dry months: January, three inches—February, five—March, seven—April and May, nine inches.

It is during the periods of the year when the drying process is in greatest activity that unhealthiness prevails with greatest severity, namely, the commencement and termination of the rainy season. In the former, or that called by the natives the lesser rain (Chota bursàt), common remittent fevers arise, and at the termination, or that from 15th September to the end of October, the severest forms of the same fever prevail, but chiefly amongst the indigent natives, and Europeans newly arrived.

The connexion of the rainy season with disease would, in such a climate as this, form a highly interesting branch of inquiry; but the absence of every thing like statistical object in our hospital reports, prevents even an approach to accuracy on this, or indeed on any subject connected with climatorial influence.

THE RIVER.

By some persons who have spoken of our climate, a large portion of the evils under which we suffer, have been ascribed to the river—its supposed overflowings—its sluggish tides and foul waters—its muddy and slimy banks, and the action of a vertical sun upon them, &c.; but I shall view the river in a different and more friendly light, *as the purifier of our city.*

* Sixteen inches fell on the 10th May, in less than 12 hours.

Certain am I that without this great scavenger, to whose tides we owe more than Captain Hamilton ever dreamt of, we should now be in a worse condition even than when he left us, an hundred years ago. The truth is that, under moderate supervision on the part of the Police, the river banks are inoffensive; and along their whole extent, although crowded with buildings for a space of nine miles, disease will be found less prevalent by far, than in the interior quarters, towards the east; in short, the causes of fever are to be traced to other and more palpable sources than the river-bank, which is the most elevated of all our grounds, being from three to four feet above the surrounding levels. The causes of unhealthiness in Garden Reach after the Salt water inundation of 1833, could be readily traced to the state of the back grounds—no one ever thought of looking for them in the river-bank.

The annual rise of the Ganges and its branches is in—

	Feet.	Inch.
May	6	0
June	9	6
July	12	6
Half of August	4	0
Total....	32	0

From above 350 observations of temperature made by Mr. G. A. Prinsep, of which the details are given in the Journal of the Asiatic Society, it would appear that "the mean temperature of the surface water exceeds 81 Fahrt. every where between Calcutta and the sea." In the dry season the mean rate of motion is less than three miles per hour; in the rainy season, and while the inundations are draining off, the current runs from six to seven, and even eight miles in particular situations.

The river is at its lowest in the beginning of March, and the freshes are at their height in September, when the tides are scarcely visible off Calcutta; and the river water is "perfectly sweet, far beyond Saugor in the open sea."

The following table exhibits the depths of the river channel at the different seasons.

Minimum depth	$8\frac{1}{2}$ feet.	Dry Weather.
Maximum average depth of 11 of the shallowest places in the Hooghly spring ebb	$15\frac{1}{4}$,,	Dry Weather.
Maximum average depth over the same place spring flood	31 ,,	Dry Weather.

Minimum depth	16 feet		Rainy Season.
Minimum average depth of 11 of the shallowest places in the Hooghly spring ebb	$22\frac{3}{4}$	,,	
Maximum average depth over the same places spring flood	$32\frac{1}{4}$	,,	
Highest rise ditto, ditto	36	,,	
Difference between highest and lowest ..	$20\frac{3}{4}$	,,	Dry and Rains.

THE SALT LAKE.

The Salt Lake lies about three miles east of the town, extending upwards of four miles north and south: it is divided into two portions, the eastern division averaging three feet in depth, the area being seven square miles, or about 12,000 beegahs, the western is two feet in depth, and its area five and half square miles, or about 10,630 beegahs. The borders are generally under rice cultivation, with occasional patches of reed grass.

To drain the Lake for the purpose of native agriculture is therefore easy, but to deprive the ground of the sources of noxious exhalation is not so. It is not sufficient to convert the ground into a state of soft low meadow land; for the most dangerous exhalations are those which are retained, and occasionally emitted from under a crust of earth during the drying process, whereby they would appear to acquire unusual concentration, and prove the origin of the worst fevers.

It is necessary that the grounds be *thoroughly* drained, leaving none of the characters of marsh, otherwise it had better be left as it is; its present condition being one of far greater safety than such half-drained soil as that obtained from the marsh of Chartreuse, for instance, near Bordeaux, which caused in the year 1805 alone, 12,000 persons to be affected with fever, within the city, of whom 3,000 died within five months!

Two modes of effecting the drainage suggest themselves; the one by letting in the river during the rains, and thereby gaining a succession of deposits of the river silt, so as gradually to fill the Lake, and thereby bring it in time to a level with the surrounding land; this would seem the easiest; it imitates the simple operations of nature, and would be the cheapest; but perhaps not the most conducive to health. Another mode is by a deep and well constructed canal, so as to effect the drainage; but as even this must to a certain degree prove a receptacle for noxious matter, and offer a considerable surface for evaporation, a close line of umbrageous trees should be planted along each side of the canal, as being powerfully attractive of marsh exhalation.

This property in trees was practically known to the ancients,* and is now beneficially exemplified in Demerara, and other parts of Guiana, "where the humid heat constantly cherishes the seeds of disease."

The ground cleared from water, should be well ploughed and cultivated, the ploughing to be done during the heaviest rain, so as to prevent exhalation; for it is during a certain stage of the *drying process*, that marsh exhalation is most concentrated, and it has been observed in many countries, that the drying up of brackish water is more injurious than that of either salt or fresh alone. A succession of crops purifies and evaporates the soil, and thereby obviates exhalation; but they should not be of rice, or such crops as require profuse irrigation. The want of attention to some of the precautionary measures above hinted at, has neutralized the advantages that would otherwise have resulted from extensive draining executed in some parts of France and Italy; and I have only thus long dwelt on that of the Saltwater Lake, because I believe its proper performance to be a matter of great importance to this city, as far as regards the prevention of disease; and I need not here insist on the superior efficacy of *preventive* measures, such as have advanced in our own country apace with our civilization, and altogether banished from us some of the severest calamities that have ever afflicted the human race.

WOODS OF THE SUNDERBUNDS.

Imperfect as the sketch-map attached to this memoir confessedly is, it is still sufficient to afford such a view of the extent of the Sunderbunds,—that labyrinth of jungle and rivers—as may supersede any lengthened description. Extending 180 miles south and east of Calcutta, and covering a superficies of upwards of 20,000 square miles, it must necessarily exercise a very powerful influence on the temperature, humidity, and free circulation of our atmosphere, besides loading it with all kinds of exhalations. The electric condition of our atmosphere must likewise be greatly influenced by the combination of oxygen with the materials of living plants over so vast a surface, as also by the extent of evaporation from it. That the clearing of this extensive surface, therefore, would tend greatly to the improvement of our local climate, no one can doubt, who considers the question either in reference to the history of this city, or that of effects resulting from similar operations in other countries.

It would open out the city to the freer influence of the sea breezes, diminish the moisture of our atmosphere, and greatly purify it.

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* Regaud de L'Isle says of the malaria of Italy, that various obstacles form barriers which they cannot pass, and against which they deposit themselves.

It is found, contrary to the vulgar notion, that in cleared and cultivated tracts, the air is rendered drier and warmer in Summer, and colder in Winter, than in such as, from want of cultivation, remain, like the Sunderbunds, covered with wood and marsh.

If then, to counterbalance the only disadvantage attendant on clearing—some little increase of temperature, we obtain purity and dryness of our atmosphere, we shall still be very greatly the gainers; for it is not so much from the high rate of temperature we suffer, as from the excessive humidity that is conjoined to it for so many months in the year, and both which, commingled with the terrestrial exhalations, tend gradually to undermine through their united influence, the best and most robust of European constitutions.

The clearing and draining immediately around the city, partial as these are, have yet removed much of the more concentrated evil; but that which was death within a few yards, cannot but be insalubrious even at a distance.

For the following interesting observations I am indebted to Mr. MacLelland.

" I first perceived about the end of May last, that a column of clouds to the eastward of Calcutta is more or less prevalent from a little before, to an hour, or an hour and a half after sun-rise, of sufficient density to interrupt the rays of the sun and prolong the cool and freshness of morning to a later hour in Calcutta, and I presume the several stations along the Hooghly, than in any of the western provinces that I have been in.

The clouds are no doubt emanations from the Sunderbunds, and are easily accounted for by the more equable diurnal temperature secured to the swamp itself than to adjoining districts; the exhalations that rise from the Sunderbunds before daybreak are condensed on ascending into the general air, which at that hour is lower in temperature than the air on the swamp, and clouds are the natural result.

The only circumstance that interrupts the regular appearance of the clouds in question is when a fall of rain has taken place in the night, when we are sure, unless it still rains, to have a very bright morning, the precipitation having prevented the usual formation of clouds to the eastward, the sun appears earlier as it were, and if we happen to be exposed to it, we are apt to think ourselves unusually late.

For the last few mornings this friendly shield has been less regular, and it will be curious to observe what appearance the eastern horizon will present during the ensuing month, as well as at the beginning of the hot season, and whether early rains in the Silhet and Chittagong districts have any thing to do with it: the subject is interesting, and one that deserves more attention than casual observation."—*Sept. 29th*, 1838.

MEDICAL CLIMATE AND THE INFLUENCE OF SEASON.

Under this head I shall offer some cursory observations on what is usually called by physicians, "medical climate," and also some brief notices of the geography of disease, as connected with our climate and seasons.

Temperature and humidity being the elements that give activity to terrestrial emanations, and all the external causes affecting health derived from locality, I shall now consider them apart from the subjects above classed. Much has been said and written on the superior capabilities of adaptation to climate in man over the lower animals; but if the power and just application of the arts of civilization be deducted, I am disposed to think, with Dr. Johnson, that the difference would be but small; for, even with these aids we find that in this climate "many die suddenly, others droop, and all degenerate," very much as with the lower animals of more temperate regions; and all we can hope to learn is how best to conquer by obeying nature. It is thus that man, the weakest of animals, is, in reality, the strongest; and it is under circumstances apparently calculated to overwhelm and destroy his vigour that he finds the means of developing new faculties and resources which excite even his own astonishment.

Gibbon, after stating that the Roman soldiers, from their "excellent discipline," maintained "health and vigour in all climates," adds, that "man is the only animal which can live and multiply in every country from the equator to the poles. The hog seems to approach the nearest to our species in that privilege." It is true, as stated by the historian, that men do "live" in other than their natural climates, but their existence is very unlike to the health and vigour of the Roman soldier.

"The truth is, the tender frame of man is incapable of sustaining the degree of exposure to the whole range of causes and effects incident to, or arising from vicissitudes of climate, which so speedily operate a change on the structure, or at least the exterior of unprotected animals. The object of these remarks, which at first sight might seem irrelevant, will now appear. Since it is evident that nature does not operate more powerfully in counteracting the ill effects of climate on man, than any other animal, it follows that we should not implicitly confide, as too many do, in the spontaneous efforts of the constitution, but on the contrary, call into its aid, those artificial means of prevention and melioration, which reason may dictate and experience confirm. In short, that we should study well the climate, and mould our obsequious frames to the nature of the skies under which we sojourn." The above quotation I have made from the work of Dr. James Johnson, a gentleman to whom the Indian military surgeon is under a weight of obligation, which those only can duly appreciate, who look back to the state of medical practice in India when he first wrote.

Although the physical effects of climate, in forming or influencing the

differences by which the varieties of tribes of the human species are characterised, are foreign to the present inquiry, still, one cannot help remarking that, if the Bengalee is to be classed among the Caucasians,—the standard of the human race—the effects of climate and locality must indeed be great and remarkable.

No climates exist that are uniformly hot and dry, hot and moist, cold and dry, or cold and moist; yet certain countries have such a preponderance of one or other of these qualities, as to give a very marked character to the physical and moral nature of man; and physicians would do well to observe these results of climate more closely than has yet been done. "Si l'histoire naturelle a besoin d'une bonne géographie physique, la science de l'homme a besoin d'une bonne géographie médicale."—CABANIS.

The moral as well as the physical influences of climate have been considered so powerful by certain philosophers, as to make some persons doubt whether a people situated as our Asiatic subjects, are capable of receiving the impress of European knowledge and institutions. Let us hope the contrary, notwithstanding the authority of Montesquieu.

"The astonishing rapidity of political revolutions in Asia, says this philosopher, arises, however, out of one fact which is really dependent on its physical geography. In that part of the world, weak nations are opposed to strong; people warlike, brave and active, border upon those who are effeminate, idle and timid; the one must necessarily be conquerors, and the others conquered. Here we have the principal reason of the liberty of Europe, and the slavery of Asia. It is necessary, says Malte-Brun, to combine this just remark with another truth proved by physical geography, namely, that Asia has no temperate zone, no intermediate region between very cold and very hot climates. The slaves inhabit the hot, and the conquerors the elevated and cold regions."

The hot and dry season in Bengal extends from the beginning of March to the middle of June, during which the winds are steady and strong from south and south-west. The temperature rises gradually from 80 to about 90°—95° in the shade, and reaches to 100°—110° in the open air. Notwithstanding the high temperature, this season is rendered far less oppressive to the feelings than might be supposed, by means of the moisture carried along with the monsoon in its passage over the Bay, and likewise by the frequency of refreshing storms, accompanied by rain, lightning and thunder.

The most ordinary and simple effects of the season just described, when "the earth is iron and the heavens brass,"—are, determination of the fluids generally to the surface of the body, the blood being less venalized in proportion to the elevation of temperature; and respiration being less perfectly carried on, owing to the rarefaction of the air, a vicarious decarbonization of the blood is established in a great increase of the biliary secretion; while at the same time that of the urine is surcharged with saline impregnation, and much diminished in quantity. The hot season swells the exterior and

produces that general chubbiness of appearance which is so remarkable in the torrid zone, even where the weight of the body is sensibly diminished: it increases the animal heat, and accelerates the pulse, accompanied by a prodigious increase of the pulmonary and cutaneous transudations: it produces nervous excitability to a remarkable degree in some persons: eruptive diseases, latent during the cold season, become actively developed. In ordinary seasons, we find that, here, as in the West Indies, the most healthy months are from February to May inclusive; while in seasons of epidemics (cholera in particular) these are the months in which the disease is most fatal and long continued; indeed, it seldom vanishes till the setting in of the rains.

Under exposure, and neglect of temperance in diet, results ardent fever, with some serious local determination, and that very frequently to the cerebral organs—occasionally to the liver; but though this is admitted, under the measures of precaùtion dictated by common sense and experience, the very hottest are yet the healthiest of our seasons, and of our stations also, which goes far to prove that it is not heat *alone* that does all the mischief, but something else that is superadded by the stranger European, and which is not in use, or practically known to the natives of the climate. From the results of my observations on active field service, both in this country and in Ava, I am led to conclude that mere heat, unless combined with intemperance, is very rarely the direct cause of disease.*

The troops from Bengal and Madras were exposed to an excessive heat in crossing the desert from Kosseir; yet they enjoyed excellent health, because they were not exposed to excesses, and their minds as well as their bodies were kept in activity.

The equable determination to the surface consequent on the progressive increase of temperature, seems to exercise an agreeable as well as favourable influence on general health, especially in the old Indian, and even a new-comer seems to bear without complaint or injury the great augmentation of the sensible perspiration. It is only the opposite condition—the total suppression of it in our cold season, that is felt by all so unnatural and unhealthy.

Miscarriages, frequent at all seasons in India, occur yet more frequently in the hot season, and the recovery is more protracted, owing to the increased force and frequency of the circulation, especially in those of plethoric habits.

There are two classes of persons to whom our climate seems genial, the weak-chested, as they are called in England, who are of a scrofulous habit, but in whom pulmonary disease has not actually declared itself. These are

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* At Agra, the hottest of our stations, the percentage of death has not been two, or one in fifty per annum, out of a garrison of one thousand men—a more favourable result than shewn in any table hitherto prepared in India.—*Asiatic Researches.*

CAPTAIN HENDERSON.

saved by coming here; and I have known them to enjoy good health, and survive their brothers and sisters at home. The fate of persons who come to Bengal with tubercular disease is, on the other hand, only precipitated. Persons of phlegmatic habits also, with dyspepsia, languid circulation and cold extremities, seem to have better health here than in Europe.

Speaking of the effects of tropical climates, and of the means of obviating them, Dr. James Copeland remarks that the general adoption of too rich and nourishing foods and beverages by those who remove from cold to hot climates, tends greatly to increase these evils; and the influence of high temperature and of a vertical sun upon the European head, is productive of disease both of it and of the liver. To these effects, the mental cultivation and activity of Europeans somewhat predispose them; whilst their heads are not so well guarded from external influences by the constitution of its integuments and hair, and the thickness of the cranial bones, as those of the negro and mongrel varieties of our species.

The obvious indications resulting from these facts are, that natives of cold countries migrating to warm climates should, particularly if the change has been made abruptly, live abstemiously, and promote the functions of those organs which perform the most essential part in excreting effete or injurious elements from the circulation. The head should be kept cool, and protected from the rays of the sun; the surface of the trunk and lower extremities ought to be preserved in a freely perspirable state so as to take off the load of circulation, and derive from the excited liver. In order to promote the secreting and depurating functions generally, active exercise, short of fatigue, should be taken, without exposure to the causes of disease, particularly those which are endemic. As the maladies which most frequently supervene on change from cold to a warm climate proceed neither from the increased temperature alone, nor from greater moisture of the air, but from these conjoined with malaria, and not unfrequently also with wide ranges of temperature during the twenty-four hours, especially in high and inland localities, with hot days, and cold, raw and dewy nights, and with a too full and exciting diet and regimen causing fevers, dysentery and diseases of the biliary organs—care ought to be taken to avoid those causes, as well as whatever may tend to assist their operation on the frame, and to protect the system against sudden changes by warm clothing at night.

"The consideration of the effects produced by migration, during a state of disease, from a cold to a warm and moist climate, is of the utmost importance. Keeping in mind its influence upon the healthy frame—chiefly in exciting the functions of the skin and liver, and diminishing those of the lungs—we are led to prescribe it in the treatment of various diseases.

In hæmoptysis this change is obviously beneficial, especially as a warm and moist atmosphere, by this mode of operation, lessens the activity of the pulmonic circulation, and the disposition to sanguineous exudation from the surfaces of the bronchi; bronchitis and tubercular phthisis are also often

benefited, and the progress of the latter much delayed, by this change of atmosphere, especially when adopted early.

Chronic rheumatism is sometimes cured by this measure, seemingly owing to its influence in promoting the biliary and cutaneous functions.

Dropsies, particularly anasarca and hydrothorax, have been in a few instances, removed by a change to a warm climate; but whilst a moist state of the air is most serviceable in pulmonary and hæmorrhagic diseases, dry warmth seems more beneficial in dropsies, dyspeptic affections, and hypochondriasis, evidently from its effects in augmenting the insensible perspiration and the pulmonary exhalation, and imparting tone to the capillary circulation.

Besides these, gout in its early stages, *dysmenorrhœa* and *scrofula* in nearly all its forms, are benefited by a change to a warm, or even a mild atmosphere."

The above extracts are from Dr. Copeland's Dictionary of Practical Medicine, wherein are to be found observations of great value on climate and endemic influence.

THE RAINY SEASON.

Although medical authorities have not been able accurately to estimate the effects of moisture, either acting simply, or in combination with heat, yet it is certain that this last is more injurious than either applied separately. In warm and moist climates, obesity and laxity of frame are induced—a fact which was very early observed; thence the proverbial acuteness of the Athenians, and the sluggishness and stupidity of the Bœotians.

The effect of situation upon the state of the habit may in some degree depend also on the gravity or weight of the atmosphere connected with locality. When the barometer is high, we feel vigorous and cheerful; when it sinks, languor and low spirits oppress us. "Accumulations of fat are said to take place in some animals in a few hours, in certain states of atmosphere. During a fog of 24 hours' continuance, thrushes, wheat-ears, ortolans, and red-breast are reported to become so fat that they are unable to fly from the sportsman."—*Bichat.*

During the first month of our rainy season, the temperature falls considerably, accompanied by a freshness of the air delightful to the senses, after the previous excessive and dry heat. The monsoon is steady and veers to the south and south-east; vegetation springs up with all the exuberance of a tropical climate, and the dust, so offensive at all other seasons, subsides and is washed away.

From 15th July to 15th October again, we live in an atmosphere having all the properties of a tainted vapour-bath; and when the wind comes sifting through the Sunderbunds at south-east, we experience many of the

inconveniences ascribed by Hennen to the Sirocco of the Mediterranean, which, "*without affecting the thermometer or barometer in any remarkable degree,*" yet inflicts on the delicately sensitive human frame a feeling of indescribable languor and oppression, with an exhausting perspiration, much like what we suffer from in Bengal during the latter portion of the rainy season, and which a West Indian lady, speaking of the Sirocco, described as giving "*the feel as if she had been bathing in a boiler of syrup.*" This is the moist Sirocco of Bengal.

At this season, through the saturation of the atmosphere, the perspiration by evaporation is suppressed, but that by transudation is enormously increased. If it be true that an individual in health ought to be in that state of perspiration in which it is insensible, what are we to think of the exhausting drain flowing from the pores of an European during this and the preceding season, though differing in their modes of action.

As in the Sirocco we here experience an extreme oppression of the nervous energy, and consequent muscular lassitude, with disinclination to active exertion of mind or body, the body seems more bulky and *feels* heavier to the individual; the hair looks dank and greasy, while the scalp is covered with furfuraceous eruption, and exudes an unpleasant acid odour. "The walls of houses, stone floors and pavements," says Dr. Hennen, "invariably become moist when the Sirocco blows. I have seen the stone floors at Corfu absolutely wet without any rain having fallen, and gentlemen who made hygrometrical experiments, state to me, that the instrument has frequently fallen from ten to twenty degrees during the prevalence of this wind—wine bottled in a Sirocco is greatly injured, and often destroyed. Meat taints astonishingly soon during its prevalence. No prudent housekeeper ever salts meat at this time, for it either taints at once, not taking the salt, or else it keeps very badly. Drains emit more putrid smells in a Sirocco, than at any other period. No carpenter uses glue in the Sirocco, for it does not adhere. No painter willingly works during its prevalence, for his paint will not dry. Bakers diminish the quantity of their leaven during the Sirocco, as dough is found to ferment sufficiently without. It is a remarkable fact that wounds and ulcers, and the discharge from mucous surfaces generally deteriorate during the prevalence of the Sirocco, and it is equally certain that if vaccination, or small-pox inoculation are performed at this period, they are extremely liable to fail: and if they succeed, the progress of the pustule is often suspended, and it is frequently ten or twenty days in reaching the state, usually attained in six or eight." When we come to the influence on vegetable life the parallel ceases. Hennen says, that though "the Sirocco is so charged with moisture, vegetables, especially that part of them exposed to it for any length of time, appear quite shrivelled and burnt up, and very frequently they are destroyed altogether."

The whole of the latter observations are annually verified in the surgical

wards of the Native Hospital under my charge; and we have the same discomforts in perhaps a severer degree whenever a calm of any duration exists during the rains: in former times ulcers used to assume a gangrenous condition, but rigorous measures of prevention have entirely obviated these occurrences of late years.

I know nothing I should dread so much as a long calm at this season in Calcutta. It might not be followed by plague as in London, Nimeguen and Vienna, in former times; but in the result as affecting human life, I think we should not fare better than these cities.

Amongst Europeans, the diseases of the rainy season assume a character of diminished vital action; the ardent fever with burning skin and racking head, of the hot season, degenerates into the congestive form, with moist or cool skin, oppressed pulse; and the complications are generally abdominal. Dysenteries, as well as fevers, become more frequent as the rainy season advances, the former also implicating the whole of the abdominal organs; but the most severe cases, especially amongst newly arrived Europeans, are at the commencement and termination of the rains. During the former, or that called by the Natives Chota Bursàt, which leaves some days of sunshine between the falls, fevers of a severe and complicated form arise, and during the drying process which terminates the season, they are even more so: occasionally these last are attended with a yellow suffusion of the skin; but I have only once seen any thing like black vomit.

The abortions of the rainy season appear to arise from simple relaxation—the natural result of excessive humidity joined to a high temperature.

Humid air, says Dr. Edwards, at an equal or even superior temperature produces a peculiar sensation of cold which differs, not in its intensity, but in its nature. It is more profoundly felt, and seems to penetrate the whole system, and particularly disposes to paleness and shivering. By these characters, I could not mistake a species of refrigeration, which consists in the diminution of the power of producing heat.

In dry air, on the contrary, a sensation is experienced, which is called a *sharp cold*, and which designates rather the nature than the degree of sensation; moreover, it is superficial, and when the reduction of temperature is not too great, an increase of activity is experienced; the skin reddens; and in extreme cases, the limbs have a tendency to stiffen, instead of yielding to their irregular and involuntary motions, which constitute shivering. It may be seen by this comparison, and by what we have stated above, that damp cold must tend to produce in individuals whose power of developing heat is rather feeble, the series of actions which constitute the accession of an intermittent fever, especially if they are exposed to that influence during sleep. The confirmation of this will be found in the study of medical topography. In a great number of cases, these fevers are

ascribed to marsh-miasmata in fine weather, but others occur in places and at seasons at which the atmospheric-constitution which we have mentioned predominates.

A familiar but remarkable illustration of the effects of our climate may be seen in its influence on the habitations of this city. Constructed of the finest known materials, whether of wood or mortar, and of such solidity that in England they would endure for centuries, and in Upper Egypt for a thousand years, they are here, through the destructive influence, and severe alternations of climate alone, rendered in a score of years fit habitations only for crows; in less time, indeed, they may be seen reduced to a heap of rubbish, covered with vegetation.

Of all the causes which thus render household property so surprisingly perishable, humidity would seem the most influential.

THE COLD SEASON.

I believe it was Charles the First who described the best climate as that in which a man could bear exposure during the greatest number of hours at all seasons: on this view, ours is assuredly one of the worst; for even during the cold weather, from the end of October to the beginning of February, an European cannot be exposed for any length of time with impunity; the hot sun and cold parching wind, with its evening and morning rawness, cause the most uncomfortable feelings of external dryness and internal fulness, unless it be under exercise sufficient to determine moisture to the surface.

The unfavourable influence which the N.E. monsoon exercises on general health, may in some measure be ascribed to its relatively low electric state, or its being in a negative state, thus attracting the positive electricity of the animal frame, as well as that of the soil. If the powerful physical agent of electricity is that which, through the system of organic nerves, influences the various secretions, how much must our climate, and consequently our health be influenced by those causes, whether general or local, which affect the proportions of electricity in our atmosphere. Coming down upon us directly from the frozen platform of Central Asia, the temperature of the monsoon is also relatively reduced so as to absorb much of our terrestrial heat; while at the same time its hygrometric capacity is much increased, parching up the soil along with the animal and vegetable fibre. People on coming into Lower Bengal from the Upper Provinces, during the cold season, perceive an extraordinary change in the condition of the atmosphere, on first approaching the Delta of the Ganges: the bracing elastic cold is exchanged for that of a damp cellar, and thus they invariably describe it.

At the commencement of the cold season in October, the temperature and the winds are variable, the drying process is in full activity and the

unhealthiness is consequently great. In the report of Dr. Marshall and Major Tullock on the West Indies, it is stated that though the months previous to the cold ones have the most sickness, yet, "the principal mortality is during the cool dry weather, which generally prevails at Christmas."

Here, from want of statistical information, we have no means of making a just comparison.

From the 1st November to the end of February, the weather is settled and agreeable to persons in health, the monsoon keeps steadily to north-east, the atmosphere during the day is dry, and a slight rise takes place in the barometer—the thermometer ranging from 45° to 75°. The nights are damp as well as cold during this season, the dewing process being excessively productive; and the fogs which prevail occasionally are of a nature more dense than I have any where seen, except at Rangoon. On the contrary, during the day, the cold north-east wind absorbs moisture with extraordinary rapidity from every object, animate and inanimate, over which it passes. Furniture, although made of the most seasoned wood, foreign or native, warps and cracks audibly—plaster newly laid, falls from the wall through rapidity of evaporation; the old Indian becomes goose-skinned and shrivelled, with a sense of dryness in the palms of the hands, so uncomfortable as to give some persons of irritable habit, and in whom the power of generating heat may be diminished by a long residence in India, a constant sense of nervous uneasiness of the whole sentient surface, not to be described. It results also from the cold season that the blood is more venalized, a larger quantity of oxygen being consumed in the maintenance of the temperature of the body.

Chronic eruptions, in an active state of development during the previous hot season and rains, now become suddenly repelled, accompanied by headache and vertigo. In old residents the appetite fails, accompanied by an oppressive sense of abdominal fulness; and when this state is not met by a suitable change of diet, clothing, and some medicine to act on the skin and bowels, visceral congestion, œdema of the lower extremities, or some more active disease may ensue. New-born infants suffer materially from, and are sometimes destroyed by the impression of the cold on the unguarded surface. The most fatal forms of apoplexy that have come under my observation in Bengal, have occurred at this season, and paralytic affections are not unfrequent amongst the aged and infirm: indeed, it requires a degree of equilibrium, not commonly enjoyed by persons of long residence in Bengal, to take kindly to the alternation from copious and incessant discharge from the surface, to its total suppression, and consequent abdominal and cerebral engorgements. It is only to the sound of constitution, who are temperate in all ways, and thereby able to bear the cold bath, or to such as are recently arrived from Europe, that our cold season is either agreeable or healthy.

"I can bear the chilling blasts of Caledonia," says a Scotchman, quoted by Ward, "but this—this cold, I know not what to do with it."

But here I would observe, that the degrees of health and disease are not to be measured by the thermometer, taken singly; such observations in connexion with health afford little information to the medical inquirer; and it has been well observed in our own country, that the influence of the weather on the human frame is not to be estimated merely by thermometrical changes in the atmosphere.*

An east wind with the thermometer at 56° will impress the body with a more chilling effect than a south-west wind, when that instrument indicates a temperature of ten degrees lower; and a foggy atmosphere, in like manner, much more injuriously than a clear one of equal cold. In the statistical report on the West Indies already quoted, it is stated that in Jamaica the lowest mortality throughout a long range of observation was, in the three months prior to June 1827, when twelve deaths only were reported through the whole quarterly returns. The next quarter, remittent fever broke out, and among a diminished force the deaths amounted to 252 in the same period, without the thermometer indicating any further increase of temperature than about 3°, and without any remarkable change in the weather.

The diseases prevalent at this season in Bengal are, congestive fever of the continued form, intermittents, with their sequelæ of tumid or indurated spleen; hepatic insidious sub-acute inflammation, terminating rapidly in abscess, if not promptly and vigorously treated; dysentery, frequently complicated with hepatic congestion, more or less acute according to individual habit, or length of residence in India. Hæmorrhoids, with many persons, follow immediately on the drying up of the surface, and consequent fulness of the internal vessels.

The abortions of the cold months have always appeared to me connected with venous congestion, and so have the intermitting states of the pulse and epigastric pulsations common to old Indians at this season. The kidneys act during the continuance of the cold weather with diabetic violence, the urine being limpid, and they only cease to do so on the return of a warmer season, and consequent equability of circulation, causing moisture of the surface. The biliary excretion is diminished, as indicated by the whitish or clay-coloured state of the alvine discharges.

From the sketch now given of our locality and climate, it will be seen that, without taking the malarious influences into account, we are here exposed to atmospheric changes to an extraordinary degree; to an extreme of heat and dryness—extremes of heat and moisture—cold and moisture—cold and dryness. The European exile may well join in the "complaint of the black knight" of Chaucer.

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* Dr. Bateman on the diseases of London.

Nowe hote as fire, nowe colde as ashes ded;
Nowe hote for colde, nowe colde for hete again;
Nowe colde as yse; and nowe as coles red,
For hete I brenne.

Bengal has received a bad character for insalubrity, says Malte-Brun, and certainly it is in an eminent degree exposed to a succession of violent extremes and vicissitudes; at one time to excessive rain, at another to hurricanes; then to scorching heat, and frequently to thick fogs; yet the English have, by dint of prudent regimen, accommodated themselves to the climate. When Malte-Burn wrote, I fear there was not much of that "prudent regimen" to which he ascribes such happy results; but let us hope that it is now about to be attained, and that it may no longer be a reproach to us that, not satisfied with choosing the worst localities, we also adopt habits of life the worst calculated for the accommodation of our constitution to them, and their climates.

THE INFLUENCE OF CLIMATE AS AFFECTING DISEASE AND MORTALITY AMONGST THE NATIVE AND FOREIGN RACES IN BENGAL.

In any inquiry as to the duration of life, and the causes of mortality amongst the natives of Bengal, we must consider, not only that general climate has great influence upon the longevity of different races, by accelerating or retarding the development of the human system, but that, along with the worst of climates, all the institutions and habits of the Bengalees tend powerfully to abbreviate the term of life; their premature decay being in perfect accordance with their early and forced development.

The law of correspondence of the period of puberty with the whole term of life is subject to few exceptions, and has been well expressed by Lord Bacon in his Historia Vitæ et Mortis, by "Nature's finishing her periods in larger circles."

The following comparative view of the effects of different climates on health and mortality, I have taken from the recent work of Dr. Prichard, on the physical history of mankind. The rates of mortality for Calcutta are wanting in Dr. Prichard's work, and I have endeavoured to supply them from the best sources. They are here placed in juxta-position with the rates of other and remote places, as I believe the best mode of considering such questions is, through a wide field of comparison.

"The proportionate duration of human life in different climates has lately been an object of statistical enquiries, in which many distinguished writers have been engaged. It would be superfluous to enter on the present occasion into the statements connected with this subject; but it is necessary to form some idea of the manner and extent in which the duration of life is

affected by climate, in order to be prepared for estimating the facts which relate to longevity in particular races of men.

It is well known that the proportional number of individuals who attain a given age differs in different climates, and that the warmer the climate, other circumstances being equal, so much the shorter is the average duration of human life. Even within the limits of Europe, the difference is very great. In some instances, according to the calculations of M. Moreau de Jonnes, the rate of mortality, and inversely the duration of life, differ by nearly one-half from the proportions discovered in other examples. The following is a brief extract from a table presented by this celebrated calculator to the Institute. The table comprehends returns belonging to different periods, illustrative of the effect produced by political changes and improvements in the state of society on the duration of human life. I have omitted this part, and have only abstracted that which illustrates the influence of climate.

Table exhibiting the annual mortality in different countries in Europe.

In Sweden, from	1821	to	1825	..	..	1 death in	45
Denmark	1819		„	..	..	„	45
Germany	1825		„	..	..	„	45
Prussia	1821	to	1824	..	..	„	39
Austrian Empire	1825	to	1830	..	..	„	43
Holland	1824		„	..	..	„	40
England	1821		„	..	..	„	58*
Great Britain ..	1800	to	1804	..	..	„	47
France	1825	to	1827	..	..	„	39·5
Canton de Vaud	1824		„	..	..	„	47
Lombardy . ..	1827	to	1828	..	..	„	31
Roman States ..	1820		„	..	..	„	28
Scotland	1821		„	..	..	„	50

The difference of twenty-eight and fifty is very considerable; but even the latter rate of mortality is considerably greater than that which the data collected by M. Moreau de Jonnes attribute to Iceland, Norway, and the northern parts of Scotland.

In approaching the equator we find the mortality increase, and the average duration of life consequently diminish. The following calculation obtained by the same writer will sufficiently illustrate this remark.†

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* There must be a mistake in this number. According to Porter and Reikman, the number of annual deaths in England from 1821 to 1831, is one in fifty-one.

† Notice sur la Population des etas de l'Europe, par M. Moreau Jonnes. De l'Homme et de ses Faculte's, par M. Quitelet.

Latitude.	Places.	1 death in
6° 10′	Batavia	26 inhabitants
10° 10′	Trinidad	27 „
13° 54′	Sainte Lucie	27 „
14° 44′	Martinique	28 „
15° 59′	Guadaloupe	27 „
18° 36′	Bombay	20 „
22° 33′	Calcutta*	20 „
23° 11′	Havanna	33 „

It has been observed that in some of these instances the rate of mortality appears greater than that which properly belongs to the climate, as some of the countries mentioned include cities and districts known to be by local situation remarkably unhealthy. In some the mortality belongs in great part to strangers, principally Europeans, who coming from a different climate suffer in great numbers. The separate division from which the collective numbers above given are deduced will sufficiently indicate these circumstances.

	Range of observation.		
In Batavia	1805	Europeans died	1 in 11
		Slaves	1 „ 13
		Chinese	1 „ 29
		Javanese, viz. Natives	1 „ 40
Calcutta†	1817 to 1836	Europeans and Eurasians	1 „ 28
		Portuguese and French	1 „ 8
	1832 to 1836	Western Mahomedans, Bengal Mahomedans, Moguls, Arabs	1 „ 36
		Western Hindus, Bengal Hindus, Low castes, Mugs	1 „ 16
Bombay	1815	Europeans	1 „ 18·5
		Mussulmans	1 „ 17·5
		Parsees	1 „ 40
Guadaloupe	1811 to 1824	Whites	1 „ 22·5
		Free men of colour	1 „ 23
Martinique	1825	Whites	1 „ 24
		Free men of colour	1 „ 23
Granada	1815	Slaves	1 „ 22
Saint Lucia	1802	Slaves	1 „ 20

* By Dr. Duncan Stewart's table.

† Journal of the Asiatic Society, No. 82.

The comparatively low degree of mortality among the free men of colour in the West Indies, and the Javanese and Parsees, in countries where those races are either the original inhabitants, or have become naturalized by an abode of some centuries, is remarkable in the preceding table. It would seem, that such persons are exempted, in a great measure, from the influence of morbific causes which destroy prematurely Europeans and other foreigners. That the rate of mortality should be lower among them than in the southern parts of Europe, is a fact which, in the present state of our knowledge, it is difficult to explain."

The following Tables and remarks were found by me amongst the records of the Committee for the improvement of Calcutta, and were handed to Mr. James Prinsep, who published them in the 82d number of the Journal of the Asiatic Society.

Mortality among all classes in Calcutta for 20 years; but for the Native Population only 5 years.

Years.	Protestant Burials.		Catholic burials, D. Rozario.	Catholic burials, Boitockannah.	Greeks.	Armenians.	Indo-Armenians.	Native Christians.	Natives.
1817	216		313	169	4	10	3	..	
1818	272		211	159	2	20	3	..	
1819	275		284	158	..	23	3	..	
1820	281		282	136	..	17	1	..	Native deaths for 5 years.
1821	246		277	172	..	16	3	..	
1822	324	Scotch	294	140	..	16	2	..	Hindoos .. 8299
1823	270	burying	277	156	..	10	2	..	Mussulmans 1009
1824	278	ground	282	188	..	21	1	..	—— 9308 in 1832
1825	297	began	285	154	1	12	10	..	Hindoos .. 15138
1826	275	1826.	309	145	2	19	17	..	Mussulmans 2385
1827	254	11	308	174	..	15	16	4	——17523 in 1833
1828	256	19	250	170	2	15	12	3	Hindoos .. 11167
1829	184	21	209	146	3	12	16	2	Mussulmans 1900
1830	224	26	236	138	1	14	15	..	——13067 in 1834
1831	186	29	236	122	3	17	19	8	Hindoos .. 6873
1832	217	25	269	121	1	17	16	1	Mussulmans 1229
1833	302	30	288	204	2	23	14	5	—— 8102 in 1835
1834	281	35	257	199	2	16	17	4	Hindoos .. 6366
1835	233	18	233	115	1	7	16	4	Mussulmans 1515
1836	197	26	188	104	0	15	13	3	—— 7881 in 1836
	5065	240	5288	3070	24	315	199	34	55881
	20	10	20	20	12	20	20	9	5
Average,	253	24	264	153	2	$15\frac{3}{4}$	10	$3\frac{1}{8}$	11178

Statement of the average rate of Mortality per cent. among the different classes of Inhabitants in Calcutta per Census and Table of Mortality.

Denominations.	No. of Inhabitants.	Total.	Average Mortality p. annum.	Average Mortality per cent.	
English	3138				
Eurasians.....	4746	7884	277	3½ pr. ct.	1 in 28
Portuguese	3181				
French.....	160	3341	417	12½	1 in 8
Western Mahomedans,	13,677				
Bengal Mahomedans ...	45,067				
Moguls.....	527				
Arabs	351	59,622	1607	2¾	1 in 36
Western Hindus.....	17,333				
Bengal Hindus	120,318				
Mugs	683				
Low Castes.....	19,084	157,418	9558	6 1/12	1 in 16
Armenians		636	25¾	4 1/12	1 in 25
Native Christians		49	3½	2¾	1 in 14
Chinese		862			
Jews.		307			
Parsees.....		40			
Madrassees		55			

" The great difference in mortality between the* Hindus and Mussulmans is striking, while the difference to be observed between the Portuguese, as compared with the English and the Eurasians, is equally so.

" Here is much room for speculation, and it cannot be said that as yet we have as good means of getting correct information upon this subject as they possess in Europe: nevertheless, we may approach as near as we can to the point we wish to ascertain, and we may hope to improve in such statistical records.

" The Portuguese, among whom so great a mortality is shewn, are a suffering race very subject to the catalogue of complaints enumerated in these papers; while the English and Eurasians are far more prosperous in life, and enjoy comforts and happiness in a very high degree, as compared with the former section of society. The mortality of English and Eurasians 3½ per cent. per annum, while that of the Portuguese being 12½ per cent. is very great. In 1830 I ascertained, and published in the Gleanings

* The difference of mortality amongst the Mahomedans and Hindus may be accounted for by the circumstance that the Hindus of Calcutta, consisting of families, include a much larger proportion of infant life. The same circumstance will explain the great difference between the average mortality amongst the Portuguese and the Europeans of Calcutta.—Ed. *Journal Asiatic Society.*

of Science, the burials in Calcutta of Protestant Christians from the year 1820, to shew at that time, that although the European population must have greatly increased, yet, that the deaths and burials had not increased; and now that the same population is acknowledged to have increased very materially indeed, yet we see upon referring to the first column of one of the tables, giving the Protestant burials, for the last twenty years, no increase of deaths. The years 1833-4, the two years following the sea inundations, shew the greatest mortality of late years; while among the native population those two years, shew an extraordinary mortality. The two last years shew in much of both European and Native population that healthiness is restored. The mortality among the other columns of society, the Catholic, Greek, Armenian, Hindu, Armenian and Native-Christian, are for the last twenty years, and I believe them to be nearly correct. The Chinese and Jews keep no account of their burials; I of course could not include them, and they form a minute portion of the population of this city."

"The native soldiers on the Bengal establishment, says Capt. Henderson (Asiatic Researches, Vol. 20, part 1st,) are particularly healthy under ordinary circumstances."

"It has been found by a late inquiry embracing a period of five years, that only one man is reported to have died per annum, out of every one hundred and thirty-one on the actual strength of the army.—So injurious, however, is Bengal Proper to this class of natives, in comparison with the Upper Provinces, that although only one-fourth of the troops exhibited, are stationed in Bengal, the deaths of that fourth are more than a moiety of the whole mortality reported."

That it was not less fatal of old to our Mahomedan predecessors, is evident from the following translation of Gladwin's, from the Persian:—"In former reigns the climate of Bengal, on account of the inclemency of the air and water, was deemed inimical to the constitution of Moghuls and other foreigners, and only those officers who laboured under the royal displeasure were stationed there; and this fertile soil which enjoys a perpetual spring, was considered as a strong prison, as the land of spectres, the seat of disease, and the mansion of death."

For the following Table, shewing the Mortality of the Native Population of Calcutta, from various diseases, during the Years of 1832, 1833, 1834, 1835, 1836, and 1837, I am indebted to Dr. Duncan Stewart:—

	Hindoos 151,473.		Mahomedans 59,622.		Total Native Population 217,095.		Proportion of Deaths from various diseases in every 100 Deaths.		Average proportion of Deaths from various diseases in every 100 Deaths.
Diseases.	Ratio in Six Years.	Annual Ratio.	Ratio in Six Years.	Annual Ratio.	Ratio in Six years.	Annual Ratio.	Hindoos.	Mahomedans.	Hindoos and Mahomedans.
Cholera	7·6 per cent. or 1 in 13 nearly	1·26 per cent. or 1 in 79,	3·94 per cent. or 1 in 25,	·656 per cent. or 1 in 152,	6·6 per cent. or 1 in 15.	1·1 per cent. or 1 in 90.	22¼ in 100,	25 in 100,	23⅛ in 100.
Small Pox ..	1·77 per cent. or 1 in 55,	·295 per cent. or 1 in 339,	·768 per cent. or 1 in 130,	·128 per cent. or 1 in 782,	1·5 per cent. or 1 in 66,	·25 per cent. or 1 in 400.	5½ in 100,	6 in 100,	5¾ in 100.
Miscellaneous Diseases ..	25·2 per cent. or 1 in 4 nearly,	4·2 per cent. or 1 in 24,	·11 per cent. or 1 in 9 nearly	1·8 per cent. or 1 in 54½.	21·3 per cent. or 1 in 4¾.	3·55 per cent. or 1 in 28.	72¼ in 100,	69 in 100,	70⅛ in 100.
	34·5 per cent. or 1 in 2½,	5·7 per cent. or 1 in 17½,	15·7 per cent. or 1 in 6⅓,	2·6 per cent. or 1 in 38½,	29·4 per cent. or 1 in 3½,	4·9 per cent. or 1 in 20.	100,	100,	100.

The following Table is collated from the interesting and valuable article of Mr. H. T. Prinsep on the mortality for ages and births of Indo-Britons in the Lower Orphan School of Calcutta, during 40 years, and published in the Journal of the Asiatic Society for September 1838.

Age.	Boys.			Girls.		
	Number in the House, on 31st December of each year.	Total Deaths.	Ratio of Deaths per 1000.	Number in the House, on 31st December of each year.	Total Deaths.	Ratio of Deaths per 1000.
0	2·713	486	171·480	2·766	416	144·980
1	2·430	498	185·890	2·436	496	184·830
2	2·169	186	82·220	2·203	170	74·300
3	1·968	113	55·830	2·030	80	38·640
4	1·845	65	35·230	1·790	77	42·120
5	1·725	56	31·940	1·788	52	28·690
6	1·587	42	26·110	1·677	49	28·800
7	1·451	41	27·870	1·572	30	18·900
8	1·314	36	27·270	1·431	36	24·910
9	1·186	15	12·570	1·322	14	10·530
10	956	33	33·960	1·210	17	13·950
11	750	20	26·300	1·140	18	15·660
12	528	8	15·040	1·071	12	11·130
13	287	3	10·450	951	15	15·650
14	138	1	7·240	799	5	6·240
15	70	6	82·190	626	4	6·360
16	38	3	76·920	449	6	13·270
17	19	0	.. ..	295	7	23·490
18	14	1	.. ..	194	4	20·400
19	11	0	.. ..	131	1	7·630
20	8	1	.. ..	89	1	11·230
Total ..	21·207	1·614	908·510	25·970	1·510	741·710
Mean ..	$530\frac{7}{40}$	$40\frac{14}{40}$	$22\frac{28}{40}$	$649\frac{1}{40}$	$37\frac{1}{40}$	$18\frac{21}{40}$

N. B. In forming this Ratio, as the number of Boys and Girls is stated for the last day of the year, and therefore does not include the deaths during the year, it has been necessary to add half the deaths, on the calculation that each person that died gave the rest of his life for half the time of those who lived out the year.

The following Table exhibits both the sickness and mortality of the British troops in garrison at the Presidency, together with the proportion of deaths to cases treated of the three principal endemic diseases of Bengal :—

Table of Admission into Hospital, and Deaths during 12 *Years, of the European Troops in Garrison of Fort William :—*

Years.	Strength.	Admissions.	Deaths.	Ratio per 1000 of Strength.	
				Admitted.	Died.
1822.....	866	1303	75	1,594·62	86·60
1823.....	828	1687	51	2,037·24	61·59
1824.....	736	2268	103	3,082·32	139·94
1825.....	902	2542	110	2,818·18	121·95
1826.....	863	1826	96	2,115·87	111·23
1827.....	893	1336	56	1,496·08	62·71
1828.....	913	1776	42	1,945·23	45·00
1829.....	885	1995	58	2,253·67	62·14
1830.....	808	1722	59	2,131·78	73·02
1831.....	831	1061	57	1,276·77	68·59
1832.....	771	1024	59	1,728·14	76·52
1833.....	687	1387	64	2,018·92	93·15
1834.....	608	1166	57	1,917·76	93·15
1835.....	743	1211	33	1,629·87	44·41
1836.....	734	1245	25	1,696·18	34·06
1837.....	709	899	26	1,267·98	36·07
1838.....	633	694	22	1,096·36	34·75
Total	13·410	25·142	497	.....	.....
Average	$788\frac{14}{17}$	$1478\frac{16}{17}$	$29\frac{4}{17}$	1,883·33	73·26

The ratio of deaths to cases treated, was, during ten years, as follows:—

In Fever ..... one in $28\frac{46}{198}$
„ Dysentery ..... one in $12\frac{144}{155}$
„ Hepatitis, Acute and Chronic ..... one in $18\frac{1}{2}$

Table of Admission into Hospital, and Deaths during 12 *Years, of the European Troops at Chinsurah (Depôt,)* 18 *miles distant from Calcutta.*

Years.	Strength.	Admissions.	Deaths.	Ratio per 1000 of Strength.	
				Admitted.	Died.
1826.....	1,083	818	86	755·31	79·40
1827.....	814	1,329	80	1,632·67	98·28
1828.....	200	542	20	2,710·00	100·00
1829.....	132	571	24	4,325·75	181·81
1830.....	366	822	24	2,245·95	65·57
1831.....	927	1,412	51	1,523·19	56·01
1832.....	737	1,182	41	1,603·79	55·63
1833.....	577	1,155	54	2,001·73	93·58
1834.....	784	1,308	32	1,668·36	40·81
1835.....	832	872	17	1,048·07	20·43
1836.....	743	1,428	39	1,921·93	52·35
1837.....	765	1,322	32	1,728·10	41·83
Total	7,960	12,761	500	.....	.....
Average	$663\frac{1}{3}$	$1,063\frac{5}{12}$	$41\frac{2}{3}$	1,930·40	73·72

The ratio of deaths to cases treated, was, during three years, as follows:—

In Fever ..... one in $25\frac{7}{18}$
„ Dysentery .... one in $7\frac{21}{66}$
„ Hepatitis, Acute and Chronic ..... one in $8\frac{8}{10}$

Remarks.—The above must be taken as the mortality on the spot only, and does not include the invalids, who died on their passage to England, or shortly after their arrival there, amounting to $3\frac{1}{2}$ annually. If, as is well known also, the Medical Returns be taken at the highest strength in course of the year or quarter, or a tenth part higher than it ought to be, instead of the mean monthly strength, the ratio of mortality will be greatly increased. It is believed that a correction of all errors would bring the annual mortality to more than eighty per thousand.

That in India as elsewhere age materially influences the ratio of mortality will be seen from the following Tables for the Officers of the Bengal Army, and those of the Civil Service. Out of 1184 deaths among Officers, the proportion occurring annually in each rank, and at each age, has been as follows:—

	Colonels, average age 61.	Lieutenant Colonels, average age 51.	Majors, average age 40.	Captains, average age 36.	Lieutenants, average age 18 to 33.	Cornets and Ensigns, average age 18 to 33.	General, average at all ages.
Died Annually per thousand of each Class	59·4	48·4	41·0	34·5	27·5	23·4	31·2

The mortality among the Civil Servants, for a period of forty-six years, from 1790 to 1836, exhibits almost precisely the same results,—viz.

	Above 50 years of age and 30 of service.	Age 40 to 50; service 25 to 30.	Age 40 to 45; service 20 to 25.	Age 35 to 40; service 15 to 20.	Age 30 to 35; service 10 to 15.	Age 25 to 30; service 5 to 10.	Age 20 to 25; service 1 to 5.
Died Annually per thousand of each Class	48·6	36·4	35·4	23·4	16·6	20·8	19·9

Between ten and fifteen years' service is the period, when leave of absence is allowed to those who choose to return to Europe for three years, which of course must have a material tendency in reducing the mortality of that class. With this exception the results are uniform for both civil and military servants, and they are no less so when extended to the officers of the other Presidencies.

The official results in regard to the mortality at each age among the Military Officers, and Civil Servants of the Bengal Presidency, afford a convincing proof that in the East Indies no advantage has hitherto been derived from length of residence. As those individuals are never employed out of India, and generally arrive there about the age of eighteen or twenty, their respective ages and ranks may be assumed as a criterion for estimating their length of residence in the country. On that principle, then, we find, taking equal numbers of each rank, that the mortality among the Ensigns, for the most part youths but recently arrived, is only twenty-three; while that of the Lieutenants, who must have been at least three years longer resident to have attained that rank, is twenty-seven; and that of the Captains, who must have been about twelve or thirteen years longer, is thirty-four per thousand, and so on in a corresponding proportion with the higher grades. In case it should be objected that this does not exhibit the precise operation of mortality during the first year or two of residence in the country, when the influence of acclimatization is supposed to be most strongly manifested, the following information in regard to the Civil Servants in the Bengal Presidency will supply that defect.

	Numbers alive.	Deaths in first year.	Ratio of Deaths per thousand of living.
1st Year of Residence	975	19	19·5
2d Ditto	933	22	23·5
3d Ditto	906	18	20·0
4th Ditto	874	19	22·0

Here, then, we have traced the same individuals through four successive years of residence, with the liability to mortality constantly augmenting; and unless we are to suppose that a different law regulates the mortality among Europeans in the tropical climates of the eastern and western hemisphere, we are inevitably led to the same conclusions which we have already demonstrated from the previous numerical results.—*Major Tullock's Reports.*

The comparative annual per centage mortality of the officers belonging

to the armies of the three Presidencies of Bengal, Madras and Bombay, is stated by Captain Henderson to be as follows :—

Total for Bengal, including Medical Officers	..	3·12 per cent.
,, Madras		4·49 ,,
,, Bombay..		3·94 ,,

The subject of Statistics is one that has been altogether neglected in the Medical Establishments of the Bengal Presidency; and, though the example of the Hospitals of Her Majesty's army, from which the most complete reports are made, has now been fifteen years before us, this important branch—the very central point of Medical Science—can scarcely be said to have been approached by us. It is the deficiency here complained of that has caused the omission in this report of all mention of the hospitals of Calcutta, and of the General Hospital in particular;—an institution that has existed for more than seventy years, and in which tens of thousands of European Soldiers have been treated under three or four different Medical systems, yet no one fact, out of the numerous and important observations made during that long time is known to any one of us. All this and much more has been urged by me in what I thought the right quarter, and in the most emphatic manner; but though my proposition met with no very flattering reception, I have yet the satisfaction to know that I have produced some action, tardy perhaps, yet such as will lead to some ultimate improvement. We are in India continually kept in mind of that law of our nature, by which old men are disinclined from undertaking any thing, however excellent, of which they cannot be expected to see the end. Through the operation of climate also, we have too often to lament the premature display of the contracting influences of age on the moral and physical constitution of man, to the prejudice no less of public welfare than of private happiness.

From the circumstance that no general mode of registering and recording exists, on statistical principles, which all may adopt, the great majority of experience in India perishes with individuals, and the valuable materials of a long and active life are for ever lost to the public service.

The labour of analysing observations which have been irregularly kept is immense—to some men impossible; while by order, a habit of observation is fostered and kept alive, through the increasing facility in the process, and the interest excited by the subject. Such are the opinions of some of the ablest writers in England; but they have as yet found no echo in our medical board, where we have still to regret the leaden influences of an exclusive seniority principle of promotion.

To insure precision and uniformity in reports, the nomenclature of hospitals is systematic and strictly ordered in the Royal Army, and this is one of the many advantages its plan of arrangement possesses over ours.

By a statement forwarded by the Medical Board to the Committee for the improvement of Calcutta, it would appear that during the thirty years, from 1st January 1808 to 31st December 1837, there were of admissions and deaths amongst the European patients of the Presidency General Hospital as follows :—

Total admissions 35,119
Total deaths 3,607

This, for the thirty years, gives a mean ratio of $10\frac{27}{100}$ deaths per cent. of the admissions.

The quinquennial ratios are as follows :—

	Admissions.	Deaths.	Ratio of Deaths per cent.
From 1808 to 1812.....	2·713	299	11
,, 1813 to 1817.....	4·360	450	$10\frac{32}{100}$
,, 1818 to 1822.....	6·425	657	$10\frac{22}{100}$
,, 1823 to 1827.....	9·560	1039	$10\frac{76}{100}$
,, 1828 to 1832.....	6·315	585	$9\frac{26}{100}$
,, 1833 to 1837.....	5·746	577	$10\frac{5}{100}$
Mean.....	$5·853\frac{1}{6}$	$684\frac{2}{6}$	$10\frac{27}{100}$

This is all that the Medical Board can furnish; for it was not till 1808 that any records were used, even of admissions and deaths.

It now remains to trace the general influence of season in producing sickness and mortality;—for this purpose I have prepared several Tables, and the first, exhibiting this influence on native mortality, was got up at my request, by Dr. Duncan Stewart; the period is for seven years, viz. from 1831 to 1837, inclusive :—

MONTHS.	Of 1000 Deaths there occurred in different months.	Of 1000 living Hindoos there died in different months.	Of 1000 living Mussulmans there died in different months.	Total Natives: Of 1000 living, there died in different months.
In 7 Januarys....	$92\frac{1}{2}$	$27\frac{1}{2}$	$9\frac{1}{2}$	$22\frac{1}{2}$
,, 7 Februarys ...	$67\frac{1}{3}$	$12\frac{1}{2}$	$8\frac{4}{5}$	$16\frac{1}{2}$
,, 7 Marchs	$65\frac{1}{2}$	$18\frac{1}{2}$	$8\frac{1}{2}$	$15\frac{4}{5}$
,, 7 Aprils	$69\frac{1}{2}$	$19\frac{1}{2}$	$8\frac{1}{2}$	$16\frac{1}{3}$
,, 7 Mays	$63\frac{2}{3}$	$17\frac{1}{2}$	9	$15\frac{1}{3}$
,, 7 Junes	$54\frac{1}{2}$	$14\frac{1}{2}$	$8\frac{4}{5}$	13
,, 7 Julys	$70\frac{3}{4}$	18	$11\frac{1}{2}$	$16\frac{1}{3}$
,, 7 Augusts	$90\frac{1}{2}$	26	$10\frac{1}{2}$	$21\frac{1}{2}$
,, 7 Septembers ..	$98\frac{1}{2}$	28	$12\frac{2}{5}$	$23\frac{4}{5}$
,, 7 Octobers	$104\frac{1}{2}$	30	$12\frac{1}{2}$	$25\frac{1}{3}$
,, 7 Novembers ..	$116\frac{1}{2}$	$34\frac{1}{3}$	$11\frac{3}{5}$	28
,, 7 Decembers ..	$106\frac{1}{2}$	$31\frac{1}{3}$	$11\frac{1}{3}$	$25\frac{2}{5}$

This Table exhibits in a remarkable manner the fatal influence of the months from September to January inclusive, and which would be even more striking if we possessed the means of deducting the deaths by Cholera in the months of March, April, May and June, so as to shew only the ordinary endemic influence: as it is, however, the Table is interesting and instructive.

The following Table I have had collated from the records of the Vestry: it exhibits burials in the Protestant burial-ground for twenty years, from 1819 to 1838 inclusive, and arranged in months:—

MONTHS.	Under five years of age.	Above five years of age.	Total.
In 20 Januarys	53	257	310
,, 20 Februarys	41	165	206
,, 20 Marchs	70	260	330
,, 20 Aprils	105	307	412
,, 20 Mays	104	421	525
,, 20 Junes	99	298	397
,, 20 Julys	104	285	389
,, 20 Augusts	87	389	476
,, 20 Septembers	74	379	453
,, 20 Octobers	84	368	452
,, 20 Novembers	60	379	439
,, 20 Decembers	53	349	402
Total	934	3857	4791

Thus it appears, that though the greatest number of deaths occurred in the Mays—the worst of the cholera months—the period by far the most fatal has been from August to January inclusive; and if the deaths by cholera during the hot months could be excluded, this result would appear very striking.

With a view to exhibit the simple endemic influence in the fairest manner, I again had recourse to the Vestry records, from which the following Table of Protestant burials has been framed for the twenty years just previously to the appearance of Cholera as an epidemic, namely, from 1796 to 1815, inclusive.

Months.	Under five years.	Above five years.	Total.
In 20 Januarys	28	216	244
,, 20 Februarys.....	26	153	179
,, 20 Marchs.....	31	164	195
,, 20 Aprils	33	178	211
,, 20 Mays	25	235	260
,, 20 Junes	22	209	231
,, 20 Julys.....	34	219	253
,, 20 Augusts	44	288	332
,, 20 Septembers	42	296	338
,, 20 Octobers	32	293	325
,, 20 Novembers	32	331	363
,, 20 Decembers	23	311	334
Total.....	372	2893	3265

Thus it appears, that in twenty years, Novembers were the most fatal months, and that the five months from August to December inclusive, were more fatal than the whole seven months besides.

With a view further to ascertain the influence of season on the health and mortality of the European soldiers and seamen, I have prepared the following Table from a document furnished by the Medical Board :—it exhibits the Totals of admissions and deaths in the Presidency General Hospital in each month during twelve years; the item "other diseases," has some awkwardness in it, but that I cannot help :—

Range of observations in months.	Total Admissions.					Total Deaths.				
	By acute diseases.	By chronic diseases.	By surgical diseases.	By "other diseases."	By all diseases.	By acute diseases.	By chronic diseases.	By surgical diseases.	By "other diseases."	By all diseases.
In 12 Januarys	899	64	261	245	1469	89	10	5	8	112
,, 12 Februarys.....	557	46	185	150	938	67	6	2	13	88
,, 12 Marchs	456	38	163	132	789	55	5	5	7	72
,, 12 Aprils	619	42	138	175	974	50	6	6	12	74
,, 12 Mays.....	722	70	161	178	1131	67	11	7	12	97
,, 12 Junes.....	791	63	184	186	1224	64	4	4	11	83
,, 12 Julys	843	38	176	127	1184	104	6	11	24	145
,, 12 Augusts.....	732	42	180	146	1100	88	9	9	8	114
,, 12 Septembers	683	69	148	174	1074	112	8	11	13	144
,, 12 Octobers	764	48	229	182	1223	114	4	10	8	136
,, 12 Novembers	1142	120	282	325	1869	97	4	5	10	116
,, 12 Decembers.....	948	87	247	233	1515	109	8	7	27	151
Total.....	9156	727	2354	2253	14490	1016	81	82	153	1332

Remarks.—It appears from the Medical Board's Table, from which the above is framed, that, out of 1,704 Europeans who died in the twelve years, 372 died of Cholera; 304 of Dysentery; 58 of Diarrhœa; 465 of Remittent Fever; 66 of Intermittent; 50 of Hepatitis; 88 of Phthisis, so called, but more than half were probably Bronchitis; 19 of Rheumatism; 6 only of Spleen; 8 of Apoplexy; 9 of Delirium Tremens; 6 of Small Pox, leaving 270 deaths from "other diseases."

The total admissions in twelve years are 15,293, and the deaths, 1,704.

The proportions of deaths to cases treated are as follows:—

Of Remittent Fever, 5,116 admissions and 465 deaths, or one in 11
Of Dysentery, 1,877 admissions and 304 deaths, or one in .. $6\frac{1}{9}$
Of Cholera, 803 admissions and 372 deaths, or one in .. .. $2\frac{1}{6}$
Of Diarrhœa, 608 admissions and 58 deaths, or one in .. .. $10\frac{1}{2}$
Of Intermittent Fever, 501 admissions and 66 deaths, or one in $7\frac{7}{13}$
Of Hepatitis, 446 admissions and 50 deaths, or one in .. .. $8\frac{9}{10}$
Of Spleen diseases, 58 admissions and 6 deaths, or one in .. $9\frac{2}{3}$
Of Delirium Tremens, 124 admissions and 9 deaths, or one in .. $13\frac{7}{9}$
Of Apoplexy, 27 admissions and 8 deaths, or one in .. .. .. $3\frac{3}{8}$
Of other diseases, 2,253 admissions and 153 deaths, or one in.. $14\frac{2}{3}$
Average of all the diseases, nearly one in nine.

From the Table of Seasons, as above arranged, it appears that the most healthy months comparatively, are February, March, April and May; that from June to January, the admissions range high, these also being by far the most fatal months. These results correspond nearly with observations on the climate of Jamaica, and others of the West Indian Colonies, wherein the most unhealthy as well as fatal months of the year extend from August to December inclusive; the only months comparatively healthy, being from January to June. These observations would seem to apply to most parts of the Northern Hemisphere, which generally possess the same character of climate. They also accord with the ancient maxim that held, "the Summer and Autumnal to be the most sickly seasons:"—

Saluberrimum ver est; proxime deinde ab hoc, hyems; periculosior æstas; autumnus longe periculosissimus.*

From the researches of Statistical writers, it appears that all over Europe the maximum of deaths occur towards the close of Winter, and the minimum towards the close of Summer.

In order that the table should express only the result of ordinary season and endemic influence, I have not included Cholera, which epidemic is found to prevail chiefly in the months of April, May and June.

* Celsus.

October, November, December and January, are the months in which there occurred the largest proportions of remittent fever cases, and the same applies to dysentery, diarrhœa and acute hepatitis; while Septembers alone give more intermittents than the whole of the months besides.

In order to account for the unusual mortality under all heads of disease, it is proper to mention that the descriptions of persons treated in the General Hospital, are as follows:—European soldiers belonging to detachments from Her Majesty's and the Honourable Company's regiments; recruits for ditto; the sick of all regiments returning from service, as for instance during the late Burmese war, &c.; European and American seamen from the shipping; townsmen, paupers, generally seamen; invalid soldiers on their way to England, &c. &c.:—in short, a class of persons away from that salutary control which leads to prompt measures both for the prevention and cure of disease. It thus happens that the earlier stages of acute illness are neglected;—an irrecoverable loss, and which must frequently imply the necessary loss of life.

The following Table exhibits the admissions and deaths, in each month, during the period included between 1827 and 1838, in the Hospital of Her Majesty's Corps in the Garrison of Fort William.

	Total Admissions.					Total Deaths.				
	By Fevers.	By Hepatitis.	By Bowel Complaints.	By other Diseases.	Total by all Diseases.	By Fevers.	By Hepatitis.	By Bowel Complaints.	By other Diseases.	Total by all Diseases.
In 12 Januarys	231	24	249	539	1043	7	3	20	10	40
„ 12 Februarys	266	51	263	627	1207	1	2	16	5	24
„ 12 Marchs	323	64	286	606	1279	9	1	16	10	36
„ 12 Aprils	303	66	318	708	1395	6	2	19	9	36
„ 12 Mays	418	53	330	726	1527	8	2	22	12	44
„ 12 Junes	488	57	253	698	1496	5	2	18	13	38
„ 12 Julys	403	68	314	586	1371	16	5	28	10	59
„ 12 Augusts	427	38	321	609	1395	18	4	25	8	55
„ 12 Septembers	446	42	256	557	1301	18	4	30	10	62
„ 12 Octobers	404	33	250	541	1228	23	0	21	6	50
„ 12 Novembers	423	39	203	574	1239	19	4	25	9	57
„ 12 Decembers	311	20	202	550	1083	16	1	16	10	43
Total	4443	555	3245	7321	15564	146	30	256	112	544

Remarks.—It thus appears that in the 12 years there were 15,564 admissions by all diseases, and 544 deaths, or one death in every $28\frac{3}{5}$ patients treated, being less by two-thirds than the general average afforded by the General Hospital returns for the same period—an emphatic example of the value of that internal discipline and economy in corps to which so much

preventive and curative result is ascribed by all military and medical authorities. Out of 544 deaths, 256 are by bowel complaints—146 by fever, and 30 by liver disease, leaving 112 deaths by other diseases. If, from the column of deaths, we abstract, for the hot months, those by cholera, the comparative fatality of the months from September to January inclusive, will be rendered very remarkable.

The proportions of deaths to cases treated are as follows :—

By fever 4,443 admissions and 146 deaths, or one in 30 and $\frac{2}{3}$ds, nearly: by bowel complaints 3,245 admissions and 256 deaths, or one in $12\frac{1}{2}$, nearly: by hepatitis, the very large proportion of 555 admissions and 30 deaths, or one in $18\frac{1}{2}$: by other diseases, 7,321 admissions and 112 deaths, or one in 65 and $\frac{1}{3}$d, nearly.

In order to exhibit the difference of result in the two hospitals, I subjoin the following Table :—

Diseases.	Ratio of Deaths in the Regimental Hospital.	Ratio of Deaths in the General Hospital.	Difference.
Fevers	One in $30\frac{2}{5}$	One in $10\frac{3}{5}$	Of 20 nearly.
Bowel Complaints ...	,, ,, $12\frac{1}{2}$	,, ,, $6\frac{9}{10}$	,, 6 ,,
			,, $5\frac{1}{2}$,,
Hepatitis	,, ,, $18\frac{1}{2}$	,, ,, $8\frac{9}{10}$	,, $9\frac{1}{2}$,,
Other Diseases.....	,, ,, $65\frac{1}{3}$	,, ,, $14\frac{2}{3}$	,, $50\frac{2}{3}$,,

Under the head bowel complaints it is not known whether cholera, dysentery and diarrhœa are all comprehended. This laxity in framing the table, and the lumping of 7,000 odd cases under the vague designation of "other diseases," goes considerably to vitiate the regimental return; but both errors arose from misapprehension on the part of the compiler, who is at the distant station of Meerut.

The table, with all its faults, is not without value as bearing on the three grand divisions of tropical disease,—viz. fevers, bowel diseases, and those of the liver :—but comparison cannot of course be made, to any just or useful purpose, between the two hospitals, as the one treats only a selected class of men whose mean age is 26; while the other treats the broken down and miserable of all ages, and in all the stages of their diseases.

Of a hundred soldiers who die in Bengal, Dr. Burke states that 26.8 are from fever; 7.3 from hepatitis; 30.5 from dysentery and other bowel complaints; 19.5 from cholera; 4.6 from pulmonic diseases, 1.9 of which is from phthisis pulmonalis; leaving only 11 produced by other diseases.

To conclude:—As to the constantly recurring questions, do we not live under an improved climate, and is not the mortality of Europeans greatly diminished of late years? it is not very easy to speak satisfactorily, owing to the absence of statistical record. That the climate of the actual site of Calcutta is improved to a certain extent, there can be no doubt; and that European general mortality is likewise diminished, amongst the better classes especially, I believe to be true; but the chief cause will be found in the improved habits of the latter class; for, with the troops in Garrison, notwithstanding the improved discipline and interior economy of modern times, it would not appear that mortality is much, if at all diminished, and the same may be said of the nearest military station of former times—Berhampore.*

The decrease in the proportional mortality of British troops in our various colonies, is stated by Dr. Robert Jackson to be only of recent date; and he adds, that it would not be safe to pronounce positively whether it is owing to improvement in medical management, with improvement in military economy, or to contingent and temporary change in the nature of morbid causes, producing a less aggravated form of disease than belonged to other times. The soldiers did not die in greater numbers in Germany and Holland in the war of 1793, 94 and 95, than they did in the war of 1803: Further, he says, that the mortality was not greater, cæteris paribus, in North America in the war of 1756, than in the revolutionary war of 1775—or in the late war of 1813. It is in the Navy, he might have added, that a great and progressive reduction in mortality has been effected by the measures of preventive medicine instituted in 1779.

Mortality has been nearly equal at all times in the West Indies, viz. in the war of 1756, in the war of 1778, the war of 1793, and the war of 1803.

Of the earlier health history of the European troops in Bengal, we have little or no information. I must therefore content myself with the following tables for Fort William and Berhampore, made up from scattered records procured with much trouble, from the offices of the Auditor and Adjutant General. After what has already been said, they require no comment.

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* Making the corrections stated at page 55, the Table for Fort William will give 88·40, and that for Berhampore, 102·69, as the ratio of deaths per 1000. All the Tables of the military have been framed from four official sources—viz. the Adjutant and Auditor General's Office, that of the Inspector General and the Medical Board; and where they differed, I took the estimates of the Audit Office. More deaths were recorded in the Adjutant General's returns than in any of the others. Slight errors have been made by the writer in calculating some of the Tables, but they in no manner affect the general accuracy of the whole.

Table shewing the deaths amongst the European troops in Fort William during the years specified :—

Years.	Strength.	Deaths.	Ratio of deaths per 1000 of strength.	Remarks.
1790	967	88	91·00	11 Months in Garrison.
1791	316	26	82·34	7 Months in Garrison.
1797	867	117	134·2	
1800	848	108	127·35	
1801	916	65	70·96	
1802	1020	94	92·15	
1805	927	53	57·17	
1806	1122	55	49·02	
1807	1198	49	40·90	
1808	1319	107	81·12	
1809	1182	71	60·06	
1810	1106	33	22·83	
Total....	11788	866	..	
Average ..	$982\frac{4}{21}$	$72\frac{2}{12}$	76·40	

Table shewing the deaths amongst the European troops at the Station of Berhampore during the years specified :—

Years.	Strength.	Deaths.	Ratio of deaths per 1000 of strength.	Remarks.
1788	497	47	94·56	
1791	230	19	82·60	11 Months at the Station.
1792	157	18	114·64	
1793	183	23	125·68	
1794	290	29	100·	10 Months at the Station.
1796	245	35	138·77	
1797	383	44	114·88	9 Months at the Station.
1798	403	46	114·14	
1806	835	53	63·47	5 Months at the Station.
1807	848	39	45·99	
1808	726	46	63·36	
1809	721	45	62·41	
1810	512	30	58·59	
Total....	6030	473	..	
Average ..	$463\frac{11}{13}$	$36\frac{5}{13}$	90·69	

For the following General Abstract of Admissions and Deaths by the principal Diseases among the European Troops in Calcutta, Chinsurah, and Berhampore, in Bengal Proper, I am indebted to Major Tullock.

Diseases.	Calcutta for 10 years, viz. from 1827 to 1836 each inclusive			Chinsurah for 8 years, viz. from June, 1826, to June, 1827, and from 1830 to 1836, inclusive.			Berhampore for 10 years, viz. for 1823, and from 1826 to 1834 each inclusive		
	Aggregate Strength, 7823.			Aggregate Strength, 6531.			Aggregate Strength, 11077.		
	Admissions into Hospital.	Deaths.	Proportion of Deaths to Admissions.	Admissions into Hospital.	Deaths.	Proportion of Deaths to Admissions.	Admissions into Hospital.	Deaths.	Proportion of Deaths to Admissions.
Feb. Intermittens	747	6	1 in 124½	227	4	1 in 57	1044	11	1 in 95
,, Remittens .	706	63	1 in 11	278	26	1 in 10⅔	1467	120	1 in 12¼
,, Cont. Com.	2390	53	1 in 45	1413	24	1 in 59	5324	90	1 in 59¼
Pneumonia	202	8	1 in 25	103	4	1 in 26	235	4	1 in 59
Hæmoptysis	11	3	1 in 3⅔	4	3	1 in 1⅓	10	1	1 in 10
Phthisis Pulm. ..	14	9	1 in 1½	15	9	1 in 1⅔	31	25	1 in 1¼
Catarrhus	554	24	1 in 23	217	4	1 in 54	532	8	1 in 66½
Hepatitis, &c....	490	21	1 in 23	228	19	1 in 12	636	34	1 in 18⅔
Enteritis	43	11	1 in 4	8	..	0 in 8	22	7	1 in 3
Dysenteria.....	1603	137	1 in 11⅔	1381	119	1 in 11⅔	2472	191	1 in 13
Diarrhœa	974	26	1 in 37½	475	24	1 in 19¾	1593	18	1 in 88
Colica	358	3	1 in 119	200	1	1 in 200	356	1	1 in 356
Obstipatio.....	142	..	0 in 142	90	..	0 in 90	117	..	0 in 117
Cholera Morbus	240	75	1 in 3¼	235	64	1 in 3⅔	642	169	1 in 4
Apoplexia	18	12	1 in 1½	17	4	1 in 4¼	38	34	1 in 1⅛
Paralysis	12	..	0 in 12	14	2	1 in 7	7	1	1 in 7
Amentia	3	..	0 in 3	2	..	0 in 2	..	..	
Mania	8	1	1 in 8	..	..	..	2	..	0 in 2
Delirium Tremens	37	..	0 in 37	56	3	1 in 18⅔	100	15	1 in 6⅔
Epilepsia	43	3	1 in 14⅓	26	2	1 in 13	49	4	1 in 12
Hydrops	23	8	1 in 3	20	4	1 in 5	40	12	1 in 3⅓
Rheumatisms ...	632	4	1 in 158	420	4	1 in 105	665	..	0 in 665
All other Diseases	4556	26	1 in 175	3799	12	1 in 316½	6774	18	1 in 376
Total.....	13806	493	1 in 28	9228	332	1 in 27¾	22156	763	1 in 29

J. R. M.

EASTERN HEMISPHERE.

FEVER IN GENERAL.

I.—It is not my intention to include in this Section what are called the *Symptomatic* fevers. It is to the subject of FEVER, strictly so called, that I shall confine my observations; and trite and exhausted as the theme may appear, I hope still to render it, in some measure, interesting. If I have omitted the adjective "*idiopathic*," it is not because I consider fever as in all cases dependant on topical inflammation or congestion; but because I wish to avoid a "war of words" about an abstract term. Some late writings, particularly Dr. Clutterbuck's Essay, and the "physiological doctrine" of Broussais, have divided the medical world in opinion, a considerable portion subscribing to the new theories. There is still, however, as far as I can learn, a majority in favour of the old doctrine, that fever may originate, and even proceed some way in its course, without local inflammation—or those topical affections which may be considered analogous to, or synonymous with, local inflammation.

Contrary to the usual mode of proceeding, before entering on the nature of fever itself, I shall take a rapid survey of the *causes* of this destructive disease. By systematic writers, these have been divided into remote and proximate; but the latter, being the actual *state* of the disease, will not yet come under consideration. The remote causes are subdivided into predisponent and exciting. The predisponent, however, often become the exciting, and the exciting the predisponent causes, as the following example will illustrate. Two labourers set out from London, in the Summer or Autumn, to work in the fens of Lincolnshire. The one is a sober man, the other a drunkard. The latter is attacked with intermittent fever, while the former, though equally exposed, escapes. Here inebriety is evidently the predisposing, and marsh miasma the exciting cause of the disease. But the sober man having returned to London in the Winter, commits a debauch, and immediately afterwards he is seized with ague. Here, on the other hand, the latent miasma becomes the predisposing, and drunkenness the exciting cause of the fever. Let this be borne in mind, for it may help to explain more than, at first sight, might be expected.

Speaking generally, however, the two great exciting causes of fever are human and marsh effluvia; while the predisposing causes are almost innumerable. The most prominent, however, are plethora—inanition from excessive evacuations—the depressing passions, including fear—excess,

whether in eating, drinking, or gratification of the sensual appetites—too great mental or corporeal exertion—extremes of atmospheric heat and cold, especially alternations of these, or of heat and moisture—sol-lunar influence.

Now experience has determined, that of the foregoing and many other predisponent causes, any *one* (excepting, perhaps, the last) will, when in a very high degree, induce fever without the assistance of any other. If this be the case, then, it is a natural and just inference, that the operation of marsh and human effluvium on the human frame bears a very considerable analogy to the operation of those causes enumerated as generally *predisposing* to, but sometimes actually *exciting* fever. This may give us a clue to assist in unravelling the *ratio symptomatum* hereafter; but before entering on the effects, we shall say something of the causes themselves.

II.—*Human Effluvium, or Contagion.*—The existence of this febrific miasm, as the cause of fever, does not appear to have been known to the ancients, since Hippocrates makes no mention of it, and the strict prohibitions against *contact* with unclean or diseased persons, recorded in the Mosaic code, do not seem directed against febrile, but chronic or local infection—probably against cutaneous or genital defœdations. It is curious, however, that Pliny, when describing the progress of an *endemic* fever, apparently solves a question which, to this moment, gives rise to the most violent altercations—namely, whether endemic fevers ever become contagious?—"Et primo *temporis ac loci* vitio, et ægri erant, et moriebantur; postea, *curatio ipsa et contactus* ægrorum vulgabat morbos."—*Lib.* xxv. *ch.* 26. But more of this hereafter.

Notwithstanding the exertions of Dr. Bancroft and some others to invalidate certain testimonies respecting the generation of contagious miasma, facts too stubborn to be swept away by the brush of sophistry, attest that the effluvium issuing from the bodies of a number of human beings confined too closely, whether in a state of health or disease, will occasionally produce a contagion which is capable, not only of exciting fever among those so confined, but of propagating itself afterwards from them to others.

Setting aside the testimonies of Bacon, Lind, Pringle, and others, the transports which received and conveyed home the wretched remnant of Sir John Moore's army, after the battle of Corunna, afforded the most decisive and melancholy proofs that bodies of men, confined close together between the decks of a ship in stormy weather, will soon become sickly, and that their diseases may be communicated to nurses and others, after they are landed, washed, and placed in the most clean and airy hospitals. It will hardly be contended that these men could have carried any infection on board, either in their persons or clothes, after a rapid retreat, during which almost every stitch of garment was washed from their backs by the incessant rains. A dreadful and sanguinary battle at the water's edge, gave

them no time to contract infection, or even clothe themselves, at Corunna. They precipitated themselves tumultuously, naked, exhausted, and wounded, into the first vessels that came in their way, and were there crowded, from choice or necessity, during a cold, wet, and tempestuous passage across the Bay of Biscay. On this passage a most fatal typhoid fever broke out, which spread far and wide among the nurses and medical attendants of the hospitals in England, where they were landed. They embarked, indeed, with an unusual degree of predisposition to disease, arising from excessive fatigue—chagrin—exposure to the elements by day and night—nakedness—want—occasional inebriety—insubordination—and, last of all, exhaustion, after a tremendous conflict that closed this disastrous retreat. It was highly improbable, if not utterly impossible, however, that a particle of fomites, or the matter of contagion, could exist among them at the moment of their embarkation; and it was too fatally proved, that every transport exhibited a most destructive focus of infectious fever before they reached England. I have dwelt the longer on this point because it bears upon questions that are even now agitating the public mind; and because Time's telescope cannot be inverted here as it has been on other occasions, nor facts be denied that are so recent in the memory of thousands now alive. Within a few yards of the spot where I now write (1817), the greater part of a family fell sacrifices to the effects of fomites, that lurked in a blanket purchased from one of these soldiers after their return from Corunna.

It is not so well ascertained, that the effluvia from *dead* animal matters *alone* will generate a contagious disease; at least, it has been fashionable to deny such an occurrence since Dr. Bancroft's publication. But there are not wanting respectable testimonies in the affirmative; and it does not seem very incredible that offensive exhalations from putrefying animal matters should, under certain circumstances, produce fever, as related by Forestus and Senac. The fatal fever which prevailed a few years ago at Cambridge, appears to have been of local origin at first, but propagated by infection afterwards.

Since the third edition of this work, a remarkable proof of the *febrific* power of putrid *animal* matter has been exhibited on the Island of Lintin, in the mouth of the Canton River, and is as follows:—

"An American merchant ship was lying at anchor in Wampoa Roads, 16 miles from Canton. One of her crew died of dysentery. He was taken on shore to be buried. No disease of any kind had occurred in the ship from her departure from America, till her arrival in the river Tigris. Four men accompanied the corpse, and two of them began to dig a grave. Unfortunately they pitched upon a spot where a human body had been buried about two or three months previously (as was afterwards ascertained.) The instant the spade went through the lid of the coffin, a most dreadful effluvium issued forth, and the two men fell down nearly lifeless. It was

with the greatest difficulty their companions could approach near enough to drag them from the spot, and fill up the place with earth. The two men now recovered a little, and with assistance reached the boat and returned on board. On the succeeding morning they were visited by an assistant-surgeon from an English Indiaman in the Roads, who reported the following symptoms: viz. very acute head-ache, with a sense of giddiness, and dimness of sight (which had existed more or less from the moment of opening the grave), eyes of a peculiar muddy appearance, 'resembling that generally observed in cases of Indian cholera'—oppression about the præcordia—dull heavy pain in the regions of the heart and liver, with slight palpitation at times, and fluttering pulse—sense of extreme debility, with occasional convulsive or spasmodic twitchings of the muscles of the lower extremities—nausea—slight diarrhœa—rigors succeeded by flushings of the face, neck, breast, and upper extremities—tongue white and much loaded—pulse from 110 to 120, weak and irregular—urine scanty and high-coloured—skin sometimes dry, sometimes covered with a clammy sweat. On the fourth day from the commencement of the attack, numerous petechiæ appeared over the breast and arms—and in one of the patients, a large bubo formed in the right groin and another in the axilla of the same side, which speedily ran on to suppuration. To one, the disease proved fatal on the evening of the fourth day—to the other on the morning of the fifth. For two days previously to death, the gums bled freely. The symptoms were so completely similar in both the cases, that it is needless to repeat them here. Purgatives, venesection to fifteen ounces, blisters—and ultimately stimulants, were the means ineffectually had recourse to in these two cases.

"*Dissection.*—Mr. Hamilton, surgeon of His Britannic Majesty's ship Britomart, was present at the post-mortem examination. There are few medical officers in the army or navy better qualified to appreciate the appearances.

"In both cases, the vessels of the brain were loaded, and an effusion of lymph existed between the tunica arachnoidea and pia mater—a more than usual quantity of fluid in the ventricles—upwards of three ounces of a dark-coloured liquid at the base of the brain. The optic nerve, on the right side, of one of the patients, was surrounded by a portion of gelatinous matter, where it emerges from the thalamus, and appeared thickened and discoloured—surface of the brain very vascular. The heart, in both cases, was much enlarged and distended with blood. In one case, five ounces of a dark-coloured fluid flowed from the pericardium when slit open, and the vessels on its internal surface were gorged with blood. The liver was enlarged in both instances, and its vessels completely gorged with blood, and this was indeed the case throughout the whole portal circle. The stomach near its pyloric orifice, was thickly beset, in one case, with small purple-coloured spots. The intestines in several places assumed a brownish appearance, as

likewise the omentum. There were numerous petechiæ on the surfaces of both bodies. In one of the cases, the medulla spinalis, in the dorsal region, to the extent of three or four inches, was of a light brown colour; and in the other case, it exhibited evident marks of congestion throughout. Most of the inguinal and axillary glands were enlarged and hardened, and several of them, when cut into, contained a light straw-coloured matter. No other morbid alteration of structure existed.

"One of the two, not immediately engaged in digging the grave, was attacked on the eighth day from his being on shore, and Mr. Hamilton was requested to attend with the other medical gentlemen. They found the patient retching violently, and labouring under all the symptoms of the former patients, in an aggravated degree. On examination, it was found that there had existed, for three days previously, pain and enlargement of one of the inguinal glands, which had now acquired the size of a hen's egg. For that space of time he had also felt indisposed, but did not complain or abstain from duty. Notwithstanding the state of the pulse, which was very weak and irregular, Mr. Hamilton immediately bled the patient to the extent of twenty-five ounces, previously placing him in a horizontal posture, with the view of preventing too early syncope. Twenty grains of calomel, and one fluid drachm of tincture of opium were administered instanter. This, with some other minor means, had the effect of allaying the gastric irritability. The pulse rather increased in strength during the bleeding; but soon afterwards became almost imperceptible at the wrists. Stimulants of ether, brandy, &c. were now exhibited—the patient was stripped of his clothes, and a flannel gown, previously moistened on its inner surface with a mixture of brandy and nitric acid, was put on. By means of a portable vapour bath, steam was now applied to the body and continued for half an hour, when so considerable a reaction came on, that Mr. H. thought proper to restrain it by means of another bleeding to the amount of twenty-five ounces. This had the desired effect of relieving a very acute headache, and severe giddiness, as well as a sense of fulness and dull heavy pain in the regions of the heart and liver. Upon removing the flannel gown, the whole surface of the body appeared highly inflamed and tender to the touch, and the petechiæ which had previously been spread over the breast and arms, had now almost wholly disappeared. Being enveloped in a blanket he was now removed to bed. The liq. ammon. acet. and camphor were given as sudorifics, and calomel and jalap to open the bowels. Mr. H. visited him six hours after he was put to bed—and had the mortification to find him in as bad a state as when first seen. The pulse was very feeble—surface covered with clammy sweat—lower extremities cold. The bath and other means before adopted (with the exception of venesection) were again employed, and reaction was once more excited, together with free perspiration. An alleviation of the symptoms was the consequence. Friction with mercurial ointment and liquor ammoniæ was

directed over the abdomen and thighs, while calomel was freely given until the system came under the influence of mercury, gentle purgatives being administered the while. Venesection was a third time necessary to moderate excitement and promote the action of the mercurials. The enlarged gland in the groin did not run on to suppuration, but continued hard and the same size as at first. On the fifth day, this patient was out of danger, being in a state of ptyalism. It was about three weeks before he was able to resume his duty. The fourth man had a slight indisposition; but not of any consequence or decided character. Every precaution was taken to prevent the diffusion of the disease on board the vessel, by cleanliness, ventilation, fumigation, white-washings, &c. and no farther sickness occurred."

I think the foregoing document (from official records) will satisfy the most sceptical that putrid *animal* matters, may, under certain circumstances, produce fever, and that of so malignant and fatal a character as to closely resemble plague itself. No little credit is due to Mr. Hamilton and the other medical officers, for the zeal and ability manifested in the dissection of the fatal cases, and treatment of the man who survived.

Of what this contagious matter consists, we are totally ignorant, as it is perfectly incognizable by the senses, and incapable of being submitted to chemical analysis. Many people have declared that they felt an indescribable taste in their mouths, and sensation over their frames, together with a peculiar odour impressed on their olfactories, at the moment of imbibing the poison; but it cannot be ascertained whether these were produced by the contagion itself, or by any effluvium accompanying or conveying it.

With the laws which govern contagion, we are fortunately better acquainted. It does not appear to be much under the control of the seasons, since a full dose of it will produce the specific effect at any time of the year. As warm air causes a greater exhalation from bodies, it might, *à priori*, have been expected that this contagion would spread most in the Summer; and the popular opinion to this day is, that hot weather is prejudicial to patients labouring under typhoid fevers. We find, however, that it is in Winter that these diseases are most prevalent. The reason appears to be simply this:—the freer ventilation of Summer dilutes and dissipates the exhalations from the sick, rendering them innocuous; while the confined air of small apartments among the poor, in Winter, tends to condense, as it were, the febrific effluvia, and embue the bedding, &c. of the sick with the same; forming a fruitful source for the dissemination of the disease by means of *fomites*, a form in which the matter of contagion is eminently powerful. Experiments have proved that this contagion, when diluted with pure atmospheric air, becomes harmless at the distance of a few yards—perhaps of a few feet; and hence the surest means of preventing its dissemination are, cleanliness and ventilation. Indeed, it is only where these *cannot* be procured, that the process of fumigation need ever

be resorted to; and I firmly believe that if the latter ever checked the spread of contagion, it was more by its effects on *mind* than on *matter*. The history of animal magnetism alone will teach us how far imagination may go in actually arresting the progress of disease in its full career; and in no case have *mental* impressions more decided effects than in checking or facilitating the operation of contagion on the human body.

The next thing to be observed is, that from idiosyncrasy of constitution, some individuals are infinitely less susceptible of every kind of contagion than others; and also, that habitual exposure to it renders us more capable of resisting it, as is exemplified among nurses and medical men. This circumstance appears explicable on the principle of *habit*, which renders us able to bear a larger dose of any other poison, as of arsenic, opium, &c. Dr. Haygarth affirms, that he had been in the *habit* of breathing, *almost daily*, air strongly impregnated with the infectious miasms of fever, during a space of more than 50 years, and yet that he never but once caught a fever in all that time. Some periods of life, however, render the body more susceptible than others—the very young and very old are more exempt than those of intermediate ages. Ulcers and other chronic *diseases*, also, seem occasionally to confer an insusceptibility on the constitution. The *latent* period, or that which elapses between the reception and manifestation of the contagion, differs exceedingly, according to the degree of concentration in the poison and the predisposition of the subject. There is no doubt but that many doses of the poison are received which produce the fever or not, according as the various predisposing causes are applied. It is, however, seldom less than fourteen, or more than sixty days between the receipt of the miasm and the evolution of the fever.

III.—*Marsh Miasma.* The febrific effluvia of marshes, as well as human contagion, seem to have escaped the notice of Hippocrates. This is the more to be wondered at, as many of the fevers which he describes are clearly the bilious remittent fevers of the present day, [*see, for instance, Popularium*—1. *Ægrotus octavus,*] and produced, of course, by the same causes. Lancisius was among the first who drew the attention of medical men to the subject, since which, marsh effluvium has been traced as the cause of some of the most destructive endemics that occur both within and without the tropics.—The fevers of Cadiz, Carthagena, Gibraltar, and Zealand, may compete, in respect to virulence and fatality, with those of Batavia, Bengal, St. Domingo, and Philadelphia. The term *marsh*, is not so proper as *vegeto-animal* effluvium or miasma; since experience and observation have proved that these febrific exhalations arise from the summits of mountains as well as from the surfaces of swamps. The mountains of Ceylon covered with woods and jungle, and the vast Ghauts themselves, give origin to Miasmata that occasion precisely the same fever as we wit-

ness on the marshy plains of Bengal.—But the subject of Miasmata will again come under consideration, in the Section on Endemic of Bengal.

IV.—*Ratio Symptomatum.* We now proceed to trace the *action* of these febrific causes on the human frame—or in other words the *ratio symptomatum* of fever itself; for in nature and in truth, there is no such thing as a *proximate cause* of this disease, the whole train of symptoms being a series of causes and effects, extremely difficult to delineate or comprehend. If any thing could deserve the name of *proximate cause*, it would be some peculiar state or phenomenon *invariably present* at the beginning of fever, and without which the disease could not be said to exist. But all writers agree that there is no *one* symptom, state, or phenomenon which is constantly observable in fever. Neither quickness of pulse—increased heat—thirst—nor headache, can be laid down as pathognomonic; for although *some* of these are *always* present, no *one* of them is invariably so.

If an appeal, however, be made to accurate clinical observation, it will probably be found, that from the first till the last moment of fever, *two phenomena* are constantly present—a derangement in the balance of the *circulation*, and of the *excitability*. If the calibre of the radial artery, or the strength and velocity of its pulsations shew nothing preternatural (which, by the bye, will be a rare occurrence), yet the experienced physician can instantly detect the unequal distribution of the vital fluid, as well by the torpid state of the *extreme* vessels on the surface, and throughout the glandular system, as by the turgidity of the *primary* trunks, and *vice versâ*. The imperfect perspiration and secretions will point out the one; the peculiar febrile anxiety—hurried respiration on attempting to sit up or move—fulness of the præcordia, and heaviness about the head, will clearly demonstrate the other. In no one instance, during a long acquaintance with fever, have I failed to notice these indications of a deranged balance of the *circulation*.

The proofs of broken balance in the *excitability* are equally manifest. It is now well known how much the functions of the glandular system are dependant on the nervous. In fever, the secretions are never all perfectly natural. They are in general scanty—sometimes preternaturally copious; but some of them always depraved. While this torpor or irregularity is going on in the glandular system, the nerves of sense shew plain marks of inequilibrium of excitability. The same degrees of light and sound that in health would be pleasing, will, in fever, be either distracting, or incapable of making any impression at all. The stomach will be in a state of morbid irritability, and the intestinal canal completely torpid. Speaking generally, however, the glandular or secreting system is irregularly torpid—the nervous or sentient system, irregularly irritable and debilitated. In short derangement of function in the vascular and nervous systems is predominant in all fevers.

Now if we find that the general operation of the various *predisposing* causes of fever, is to disturb more or less, according to the force and condition of the subject, the balance of the circulation and excitability, we advance one step nearer to a knowledge of this *proximate cause* in fever, because we find in it the same *ratio symptomatum* as in all the phlegmasiæ, modified only by the *exciting* cause. For example: one man is exposed to a rapid atmospherical transition, or a current of cold air when the body is heated; another man is exposed to the effluvium issuing from the body of a typhous patient; a third commits a great and unaccustomed debauch in spirituous or fermented liquors:—a fourth is overwhelmed with a series of losses and misfortunes; a fifth is exposed to the exhalations arising from a fen; while a sixth performs a rapid and toilsome march under an ardent sun. These six men (and the list might be far extended) will have six different kinds, or rather forms, of fever—all agreeing, however, in the two points under discussion, [a derangement of balance in the circulation and in the excitability] but each offering *peculiar* traits and phenomena, in consequence of the *peculiarity* of cause.

Thus the *first* patient will, in all probability, have a fever remarkable for great vascular action, or derangement of the circulation, with a determination to some internal organ, most likely the lungs, in which determination or inflammation consists the chief danger.

The *second* man will have a fever at a much longer interval from the application of the cause, and which, contrary to the former case, will shew greater marks of derangement in the balance of the excitability, than of the circulation. In this instance, the functions of all the organs will be more or less affected; the fever sometimes running its whole course without producing morbid alteration of structure; at other times, giving origin to congestion or inflammation in the brain, liver, stomach, &c. destroying the patient at various and uncertain stadia of the disease. To these peculiarities may be added the power of propagating itself by reproduction in other subjects.

The *third* man will have high vascular action with considerable determination to the head, stomach, alimentary canal, &c. or, probably, that peculiar affection denominated "delirium tremens."

The *fourth* will have what is called a slow nervous fever, so admirably described by Pringle and others, not unfrequently degenerating into the typhoid form of the second example.

The *fifth* will have a fever differing from all the preceding, inasmuch as it will shew great remissions, or even intermissions, on alternate days with determinations, if long continued, to the liver and spleen.

The *sixth* man's fever will evince great violence at the beginning, with little or no remission; and end in a sudden determination to an internal organ—generally the liver; or change into a tedious and dangerous typhoid

Now the only symptoms or circumstances that are *invariably* present in *all* these cases, are the *inequilibria* above-mentioned; the other varieties appearing to depend on the difference of cause, and idiosyncrasy of constitution. Need we then seek farther for a *proximate cause* of fever?

All the causes, then, of fever, from the most remote and predisposing, to the most immediate and exciting, however varied may be their *mode of action,* tend constantly to one point, and directly or indirectly induce derangement in the balance of the circulation and excitability. Some of these *appear* to produce their *first* effects on the vascular, others on the nervous system. Thus atmospherical vicissitudes evidently give rise to violent oscillations of the circulation; yet these transitions, and still more the oscillations, must secondarily affect the nervous system. On the other hand, human and marsh effluvia seem to make their *first* impression on the nervous system, the circulation apparently becoming deranged consecutively. Of the two febrific causes, however, human contagion shews its effects most on the nervous—marsh miasma on the circulating system. Debauches and excesses operate on both systems, hurrying the circulation, exhausting the excitability, and producing fever, with or without local inflammation. The depressing passions, like human and marsh poison, seem also to affect, *primarily,* the nervous system, which, through every stage of the fever, bears the onus of disease. Excessive muscular action and an ardent sun so much derange the circulation and the functions of certain internal organs, as to induce great fever, with determination to the biliary organs in particular.

The manner *how,* and the reason *why,* these various causes, predisponent and exciting, act on the human frame, producing the phenomena of fever, are equally inscrutable as the manner *how,* and reason *why,* tartrite of antimony should have a tendency to act on the *upper,* and aloes on the *lower* portion of the alimentary canal. Let any person demonstrate the *modus operandi* of these two simple substances, and then I will engage to demonstrate the *modus operandi* of human and marsh effluvia. The nature or essence of many of these causes themselves, is also totally beyond our comprehension at present. Some of them are even *ideal,* as the various depressing passions, &c. Yet we must not cease to investigate the *effects,* though we are ignorant of the nature and mode of action of the *causes.*

We shall now select one cause, and trace its operations on the human frame, as a specimen and attempt at explanation of the ratio symptomatum in all:—The varieties of, and divergencies from, this specimen being, as I have stated before, ascribable to variety of cause and peculiarity of constitution.

A man, after exposure to the miasmata of marshes, begins to exhibit symptoms of diminished energy in the nervous system, evinced by the various feelings and phenomena which usher in the cold stage of fever.

The power of the heart and arteries appears evidently to be weakened, the consequence of which is an inability to propel the blood to the surface, and throughout the secretory organs; and from the diminished excitability of the system, we observe a degree of quiescence of the capillaries, and a shrinking and coldness of all external parts, without the intervention or necessity of spasm. In this state it follows, of course, and is allowed by all, that the great volume of blood is confined to the heart, and large internal trunks of vessels. But this appears an inadequate explanation of the swelling, tension, oppression, and even pain about the hypochondria, as well as of many other of the symptoms attendant on the cold stage of fever in particular. If, during the latter, I place my hand on the radial artery, and endeavour to estimate its calibre, and the quantum of blood transmitted through it in a given time, compared with what takes place in the hot stage, or even in health, I must conclude that the artery is not then above one-third the size, nor the quantity of blood passing through it, more in proportion. Such being the case, it is difficult to conceive how the whole mass of blood can be in *actual* circulation at this time. Besides, therefore, the confinement of a considerable share of it to the large vessels, where its motion must be slow, I venture to believe that another large portion of it is *arrested*, as it were, and accumulated in certain situations, where it remains, *pro tempore*, out of the course of *actual* circulation. This congestion, or complete quiescence, takes place in the portal circle, where the blood is at all times languid in its current, there being only a slight *vis à tergo*, and but little muscular propulsion. The consequence of this must be, that not only the liver and the various branches of the vena portarum will become turgid, but also the spleen (which returns its blood to the heart through this channel), the stomach, pancreas, and intestines, will participate in this turgescence.

If it be asked why the blood should cease to circulate in these parts during the cold stage of fever, sooner than in others; I answer that the portal is the only circle or set of vessels in the sanguiferous system, *originating and terminating* in capillary tubes, or inosculations with other vessels.—They begin by the minutest threads from the stomach, spleen, pancreas, and intestines:—these enlarge as they approach the liver; there they diverge, and finally dwindle again into the same capillary system with which they commenced. All other veins dilate as they approximate to the heart, thereby affording more and more facility to the return of the blood, which is in most places assisted by the action of circumjacent muscles. The temporary quiescence or torpor, then, of the extreme branches of the vena portæ in the liver, from consent with the extreme vessels on the surface (afterwards elucidated, and I hope satisfactorily proved) must completely check and arrest the reflux of blood from the whole of the viscera above-mentioned. This state of things at once explains the tension, elevation, pain, weight, and anxiety about the præcordia. It shews why the

biliary and pancreatic secretions are in common with, and still more particularly than others, entirely checked for the time, while the gradual accumulation and temporary abstraction, as it were, of so great a proportion of the vital fluid from *actual* circulation, will readily account for most, if not all the phenomena of the *cold* stage, many of which were inexplicable on other principles. It appears to me, indeed, that this *temporary* arrest of so much blood in the liver and portal circle (including the spleen), is one of the most admirable of Nature's expedients to obviate more dangerous effects. When the balance of the circulation is broken, and the blood is determined from the surface upon the internal parts, were it all to accumulate in the large vessels about the heart, and in the lungs, immediate death would be the consequence; but the local abstraction of so large a proportion of it from *actual circulation*, by its quiescence in the circle above-mentioned (where plethora is not so immediately detrimental), preserves the heart and lungs from being overpowered and suffocated, till reaction restores the equilibrium between the surface and the interior. From this view of the affair, the utility of the spleen, as an organ of preservation is no longer doubtful.* But this accumulation of blood in the portal circle and viscera must, of necessity, produce a corresponding plethora in the branches of the cœliac and mesenteric arteries leading to them; and since such large and important exits for the blood from the descending aorta are, as it were, blocked up, a greater share of the circulating mass will be thrown, in consequence, through the carotids and vertebrals on the brain, occasioning or increasing the head-ache and congestion in that organ. This, and the congestion in the lungs, however, will be principally caused by the difficulty, indeed, the inability, of the heart to propel the blood from the ventricles as fast as it returns to the auricles from the brain and lungs; hence the *venous* turgescence in both these organs, occasioning the head-ache, stupor, laborious respiration, and febrile anxiety, attendant on the collapse or cold stage.

The effects of sympathy are likewise to be taken into consideration. I have mentioned that which exists between the extreme vessels on the surface, and those of the vena portæ. The lungs, too, will sympathise with the skin, while the stomach and the liver will sympathise with the brain, and *vice versâ*.

This state of things, however, lasts not long. Reaction at length takes place. Whether it be from "the stimulus of the blood itself"—from that of the "retained secretions"—from "accumulated excitability"—from the "vis medicatrix Naturæ"—or from all combined, we need not stop to enquire (because *final* causes can never be discovered, and because we are rather tracing the *quo* than the *quomodo* in fever), but so it is, that the brain, the heart, and the arteries, re-acquire vigour—the two last driving the blood

* Vide Dr. Armstrong's query; Essay on Typhus, p. 78.

to the surface, with great increase of heat, and a more rapid circulation of the vital fluid, all of which nevertheless, does not appear to come into motion till the sweating stage. For this preternatural heat, or febrile stricture, seems to have the same effect, for a time, as the previous coldness or collapse, in preventing perspiration externally, and secretion internally; since we find the load and uneasiness at the præcordia and epigastrium continue till the extreme vessels on the surface relax, and a sweat breaks out, when a *simultaneous* relaxation in the extreme vessels of the liver, lungs, &c. allows the blood to circulate freely, and the various secretions to flow, relieving the internal congestions. This last effect, so much accelerated by the cold affusion, in the hot stage of fever, seems to have escaped the notice of Currie and Clutterbuck.

As the head-ache of the cold stage, from *venous* plethora, is continued in the hot, from *arterial* distention (with a corresponding difference in sensation, as noticed by Fordyce), so the nausea and sickness at stomach, arising apparently, in the cold fit, from sympathy with the brain and liver, perhaps, the skin, is continued in the hot, from the same causes (these organs being still affected, though in a somewhat different manner); and the vomiting is often brought on, and kept up by the sudden augmentation of gastric, biliary, and other secretions of a depraved quality, which are poured out towards the commencement of the sweating stage, particularly in hot climates, and in the hot seasons of temperate climates. In general, however, the irritability of the stomach subsides, *pari passu*, as perspiration and secretion advance, with relief to the brain, lungs, liver, &c.

If, as some suppose, the cold be the cause of the succeeding hot stage, so, in the latter, the violence of the re-action, or rather over-action, of the sanguiferous system, with the morbidly increased excitement of the nervous system, must predispose to a repetition of the fits, from the subsequent atony resulting therefrom. If there be sensorial energy enough to enable the heart and the arteries to clear the viscera and brain of the load of blood with which they were oppressed, and to set the secreting organs in action, then an *intermission* takes place; but, if these circumstances be incomplete, a *remission* only. In what is called continued fever, it appears from the affection of the head, the load on the præcordia, the confined pulse, the dry, hot, and constricted skin, with a corresponding diminished biliary secretion, and costive bowels, that the constitution is called upon for almost constant, or at least frequently reiterated, exertions to relieve the internal congestions, and restore the secretions and excretions, marked by more or less of morning remission and evening exacerbation, till it either becomes habituated to the original cause, and restores the balance of the circulation and excitability, or sinks, unequal to the task, most commonly with the destruction (from inflammation or sanguineous determination) of an organ essential to life. Dissection has so repeatedly detected the existence of these inflammations, congestions, and effusions, in

all fevers of violence, that it is not necessary here to exhibit examples in proof of the position. But it may be remarked, *en passant*, that no *one organ*, not even the brain, is so invariably the seat of lesion as to enable us to build any theory on the subject, and hence Drs. Clutterbuck and Broussais have over-shot the mark, by confining the cause of fever within the cranial parietes, or the intestinal tube.

V. Remedies.—We now come to try the above theory by a direct application of its principles to *practice*, the grand and only legitimate criterion of its truth. If we can shew that it is consonant with, and elucidates, the operation of those remedial measures which either ancient or modern experience has employed in fever, it is no trifling corroboration of its solid foundation. And, even if it points to the most successful plans of treatment which modern investigation has devised, it must be allowed to be a useful, though perhaps only a visionary theory.

It will not be necessary, however, to examine the whole farrago of remedies which ignorance, superstition, or prejudice, had, at various periods, introduced for the treatment of fever; it will be sufficient to notice those which have stood the test of time.

1*st*. *Venæsection*.—Bloodletting is as ancient as the wars of Troy, and the practice of Podalirius. If Hippocrates neglected it, Aretæus, Celsus, and Galen, made ample use of this important measure. It is true that, even in our own times, the dogmas of the schools had nearly proscribed, for a while, what Nature and observation had pointed out from the earliest dawn of medicine to the present time, in every climate, from the banks of the Scamander to the vales of Otaheite. The bounding pulse, the fever-flushed cheek, the throbbing temples, and aching head, must indeed have vindicated the propriety of bloodletting in every æra, and in every mind not warped by the bias of some fashionable doctrine. In these scrutinizing days of investigation and experiment, the lancet has dispelled the mists of prejudice, the phantoms of debility and putrescency, with the delusions of the Brunonian school; and bleeding is justly regarded as the paramount remedy, not only in symptomatic, but in most of the more violent and fatal idiopathic fevers, especially of hot climates.

The consonance of this measure with the principles I have laid down, is so evident as scarcely to need comment. When the balance of the circulation is broken, and determinations take place to one or more organs, the most effectual means of restoring the balance, and of relieving these organs or parts from their overplus of blood, will be found either in local or general abstraction of the vital fluid. It is not from there being *less* than usual of blood in some parts, but from there being *too much* in others, that the danger consists, and that we are called upon to reduce the whole mass below par. Nature herself invariably points out this indication, and, in perhaps

a majority of instances, fulfils it in her own way. Thus we find that every paroxysm of fever is terminated by some evacuation from the system, whether by perspiration, urine, increased secretions, or some local hæmorrhage. In what is called *continued fever*, the nocturnal exacerbations are terminated in the morning by some slight modifications of the foregoing evacuations; and in all fevers, and all stages of fever, Nature effects *depletion* by preventing *repletion;* and hence that invariable attendant on fever, *anorexia*, is one of the wisest and most salutary measures which Nature can put in force to finally overcome the disease; though she is too frequently baffled in her attempts by the officious interference of the cook, the nurse, or perhaps the medical prescriber.*

I shall now make a few remarks on the most judicious manner of employing bloodletting in fever; for on this, in a great measure, depends its success; and to the contrary, I believe may be attributed not only its failure, but its disgrace.

In the first place, the time for bloodletting in fever should be an object of great attention. It should not only be *early* in respect to the accession of the fever, but the acmé of the paroxysm, or the height of the exacerbation, should be selected as the proper period for making the abstraction.† At these times the evacuation will produce an alleviation of symptoms, and often a solution of the paroxysm or exacerbation; whereas, if taken during the remission of the fever, when the system is, as it were, in a state of collapse, deliquium animi is often the consequence, followed by a train of nervous symptoms and debility that are charged on the *measure*, when they ought to be placed to the account of the ill-judged period of its application.

The manner in which blood is drawn ought not to be neglected. When any strong determination to the head or other organ exists, the vascular system so accommodates itself to the loss of blood from a *thready* stream, that little or no relief is obtained for the suffering viscus, while the general strength is unnecessarily reduced by the quantum lost.

Although we are to be much less guided by the appearance of the blood drawn, than by the order and violence of the symptoms; yet, as a certain coat or crust of fibrine very generally, though not invariably, covers the coagulum when there is any local inflammation going on, we should attend to those circumstances, in the abstraction, that are favourable to the development of this criterion. Thus the stream of blood should be free and of a good size; and it should be received into the centre, not impinged against the side, of a narrow and rather deep bason, with a polished internal surface. If the reverse of these directions be observed, as is too often the

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* Indeed it is highly probable that, in a great majority of the mild fevers of temperate climates, Nature would be more successful than Art—that is, that drink *alone*, which is always craved by the patient, would be more effectual than the farrago of medicines prescribed by the routine practitioner. Let not this, however, be told in Gath!

† Dr. Mackintosh's plan of bleeding in the cold stage of fever has failed.

case, the blood will not exhibit any inflammatory buff, though inflammation be actually present at the time.

In fevers, as well as in some inflammations, it is not so much the general plethora of the vascular system, as the broken balance of the circulation that is to be corrected; hence local abstractions of blood from the vicinity of those parts where the congestion or determination exists, are often of more importance than general bloodletting.

It is to be regretted that, whether from the prejudices of the patient or the inattention of the practitioner, the seat of the determinations in fever is rarely ascertained and relieved by topical bleedings. The violent headache, indeed, and arterial pulsation at the temples, frequently draw the practitioner's attention to that part, and leeches are accordingly applied; but the epigastric region, where there is always more or less fulness, and to which the vital fluid seems, in most fevers, to gravitate, is too much neglected. Leeches or scarifications should long precede the necessity for blisters in these parts.

Since the doctrines of Broussais have become fashionable in France and other parts of the Continent, the practice of applying numerous leeches to the epigastrium and abdomen, on the supposition that gastric or enteric inflammation form the basis of all fevers hitherto denominated idiopathic, has probably been productive of much benefit, although the theory on which the measure was founded might have been erroneous. This leeching, too, is still more necessary among the disciples of Broussais than among British practitioners, because purgatives are, by them, considered most dangerous remedies, as adding to the gastro-enteritic irritation. It is highly probable that a middle course between the extremes of the two countries would be beneficial for the patient, especially in the common fevers of Europe—that is, a greater attention to local bleeding than is customary in England—and a greater attention to keeping up a proper action in the bowels than is usual on the Continent.

2. *Purgatives.*—The ancient Physicians had a very limited range, and a very rough list, of purgative medicines. They made, however, a considerable use of them. Of late, they were almost neglected by Cullen, and proscribed by Brown, in the fevers of this country, unaccompanied with topical inflammation. Dr. Hamilton, and the greater number of modern British and American practitioners, employ purgatives freely, without fear of the far-famed and much dreaded debility of Brown, or the gastro-enteritic irritation of Broussais.* The principle on which these act, in fever, is by no means

* I have alluded to the great error into which the disciples of Broussais are necessarily led by their exclusive doctrine of all fevers, denominated idiopathic, being, in fact, neither more nor less than *gastro-enterites*. This doctrine at once proscribes all medicines of the purgative class, since they would be preposterous in an irritable or inflamed

generally understood; and the practice itself is frequently inefficient from this cause. Even Dr. Hamilton seems to attribute most of the good effects of purgatives in fever to the removal of irritating fæcal remains. But if this were the case, the glysters of Cullen would have answered the same end, which, however, they did not. The removal of accumulations from the small intestines particularly, gives a more free descent to the blood through the abdominal aorta and its branches, and thus mechanically assists in the restoration of balance; the increased secretion from the mucous membrane of the alimentary canal, must also powerfully deplete the cœliac vascular system; but a very salutary *modus operandi* of purgatives in fever, has, I believe, escaped the notice of physicians, although I conceive it to be an important one; I mean the change from torpor of the intestines to a brisk peristaltic motion, whereby the blood, which has been shewn to accumulate, and, as it were, stagnate, in the portal circle, is propelled forward, and the biliary, as well as other secretions increased. Another salutary effect is produced by the sympathetic influence which the internal surface of the alimentary canal exerts on the cutaneous surface of the body; for although drastic purging will check profuse perspiration, yet, where torpor pervades both the internal and external surfaces of the body, a restoration of the functions of the former contributes to the same event in the latter; a fact of which any one may convince himself, at the bedside of sickness, by an attention to the circumstances under consideration.

When, therefore, the peristaltic motion, the gastric and intestinal secretions, are roused by purgatives, the head, which, from the peculiarity of its circulation, must suffer sanguineous congestion, is almost immediately relieved by the *change of balance* thereby induced. From these considerations, it will not appear a matter of indifference what purgative medicine we use. Experience has taught us that some (for instance, castor oil) do little more than clear the intestinal canal of what already exists there; that others (for instance, the neutral salts, jalap, &c.) produce copious *watery secretions* into the alimentary tube, during their operation; and that others still, (for instance, some preparations of quicksilver) besides acting as a common purgative, increase particular secretions, as of the bile, and carry them off, whether in a healthy or morbid state.

From the importance of the hepatic function in the animal economy, and bad effects which result from any derangement or obstruction of it in febrile commotion, it is evident, and experience proves it, that, into the

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state of the mucous membrane of the stomach and bowels. There can be little doubt that mortality would be general among the patients of this school, were it not for the perpetual leeching of the abdomen which they employ, and which proves a counterpoise to the neglect of purgation. The Brunonian proscription of this class of medicines had not the redeeming clause of Broussais, and hence the want of success soon brought his theory into disrepute, and led to its quick extinction among all observant practitioners.

combination of purgative medicines in fever, those of a cholagogue power should very generally enter. Hence it has been found, both in this and other countries, that powdered jalap and submuriate of quicksilver formed a composition admirably adapted to the purposes abovementioned, as may be seen in the writings of Rush, Jackson, Hamilton, Armstrong, Dickson, &c.

Hence, also, we see how purging, by rousing the torpid circulation and excitability of the abdominal viscera, determining the blood through the various branches of the aorta, and thereby removing the congestion in the head, restores strength, by relieving the sensorium, instead of adding to the pre-existing debility, as was dreaded by the Brunonians and Cullenians, and which dread still fetters the hands of numerous practitioners, even in this country. The operation of purgatives, then, is perfectly consonant with, and elucidates the fundamental principle to be kept in view in fever —"*a restoration of equilibrium in the balance of the circulation and excitability.*" At the same time, I would by no means advocate the indiscriminate and excessive use of this class of remedies in the fevers of temperate climates, and those low and protracted fevers which we observe in large masses of society, especially among the poor. These fevers will generally run a course in spite of all remedies, and our principal object is to watch the course of the disease, and endeavour to guard whatever organ happens to be threatened at any period of it. It is different with the rapid and dangerous fevers of the Torrid Zone, where we must often restrain the violent efforts of Nature by the most active and efficient means.

3. *Cold and Tepid Affusion.*—The operation of these *apparently* different measures, in mitigating or even arresting fever, is in perfect consonance with the principle laid down. Leaving out the effect of *sensation* on the nervous system, during the affusion of cold water on the febrile surface of a patient, it is evident that the violence of reaction (at which time alone it ought to be applied) is mitigated by the cold, while the febrile irritation of a strictured surface is taken off. That these objects tend to a restoration of balance in the circulation and excitability, need not be insisted on; the other effect of cold affusion, namely, a subsequent perspiration, will also be found to have a similar tendency.

The effect of *tepid* affusion during reaction, or the hot stage of fever, is precisely analogous to that of the cold, only less forcible in degree; for it must be remembered that the tepid bath is, or ought to be, of a much *lower* temperature than the surface of the body, when applied in the *hot* stages of fever, and consequently acts in reality as a cold bath, only in a much more gentle manner.

When it is applied in the cold stage of fever, its operation in drawing the blood to the periphery, and thus restoring the balance of the *circulation*, is direct and obvious; while, in restoring sensibility to the torpid skin, the

balance of excitability is, of course, equipoised. The action of cool air in fevers is easily explicable on the same principles.

4. *Mercury.*—Various have been the disputes respecting the operation of mercury on the human system. A stimulant property has been very generally attributed to this mineral, apparently from its quickening the vascular action, and "exciting an artificial fever."* "Hence," says the Enquirer, [*loco citato*] "its efficacy in remittent and continued fevers is very equivocal. At the commencement of those diseases I believe that it does mischief, if exhibited in any form to exert its power on the salivary glands *alone*." It would be difficult to select a passage, in any medical work, which contains so much error, and so much want of knowledge, in so small a space, as the above paragraph. In the first place, those who condemn the use of mercury most, condemn it on this principle, that in some very concentrated forms of inflammatory fever, as the endemic of the West Indies, it cannot be brought to exert its influence on the system in time, and, therefore, there is danger in trusting to its operation. Mr. Sheppard, of Witney, one of the ablest of the anti-mercurial party, expresses himself thus:—"The co-existence of febrile and mercurial action is generally admitted to be incompatible; if, therefore, the action *could* be superinduced in violent fever, we should be possessed of an invaluable remedy."—*Ed. Journal, October,* 1817.

In the second place, who ever saw mercury affect the salivary glands *alone?* Narrow, indeed, is that view of the mercurial action which stops short at its quickening the pulse, and "exciting an artificial fever." The fact is, that ptyalism is merely a symptom that the salivary glands are affected, in common with every other gland, and every secreting and excreting vessel in the system. Thus, flood-gates are opened in all directions, and every part of the human fabric experiences a rapid diminution—in short, mercury is never more an *evacuant* than when it produces ptyalism. This general depletion is still farther increased by the ptyalism preventing any supply of nutriment which the patient or friends might wish to introduce.

I am ready to grant, indeed, that in certain high grades of the western endemic, or yellow fever, we cannot bring on this constitutional effect of mercury; and why? Let Mr. Sheppard himself answer the question. "From the experience of many years within the tropics," says this judicious observer, "I am disposed to coincide with those who believe that the disease, in the highest degree of concentration, is *irremediable* by any known means in medicine; for I have remarked, in this extreme case, that whatever plan of cure may be adopted, the rate of mortality remained unaffected by variety of treatment."—*Loco citato.* Now, if mercury fails in these

* Ed. Journal, vol. vi. p. 181.

cases, so does depletion; but I most solemnly protest against the inference that, because pyrexia ceases when ptyalism appears, the *latter* is merely an effect or consequence of the former.

In certain inflammatory forms of West India fevers, where hepatic congestions are comparatively rare, it is probable that depletion *alone* is the best mode of treatment; but to draw a sweeping conclusion from this circumstance, that mercury is totally useless, if not injurious, in all febrile states of the system, and in all climates, is most erroneous in principle, and injurious in practice. The ensuing pages of this Essay will afford ample illustrations of the *febrifuge* powers of mercury; while its *modus agendi*, as an equalizer of the circulation and excitability, will be found to be in exact consonance with the principles here laid down.

5. *Emetics.*—The gastric irritability which accompanies most fevers might have led to the suspicion, that Nature aimed at relief by unloading the stomach, and hence the early use of emetics.—They are now much less frequently employed; though it is certain that they produce other salutary effects, beyond the mere evacuation of the stomach. They determine to the surface, in common with diaphoretics, and produce a relaxation there, which generally ends in perspiration. Their utility, therefore, in certain states and kinds of fever is unquestionable, and consonant, too, with the principle which I have endeavoured to establish; but their violence in certain fevers and climates, where unusual irritability of stomach, or even a tendency to inflammation, too often prevails, has brought them into disuse, even in opposite circumstances. The debility, also, which they induce, gave the Brunonians a dislike to their employment. They are too much neglected in modern times.

6. *Diaphoretics.*—These have a close affinity to the last-mentioned remedies, but are of milder operation. In all fevers of a marked periodical type, there is such an evident remission or solution of the paroxysm in the sweating stage, that physicians must have very early endeavoured to imitate this salutary process of Nature by artificial means. This, however, has often led to disastrous results; for, observing that heated rooms, multiplicity of clothing, warm liquors, &c. induced perspiration in health, the same means were resorted to in disease, and too often with the most pernicious consequences. They knew not till lately, that the strictured surface of a febrile patient will seldom relax into a perspirable state, till its temperature is *reduced* below the fever heat, and, consequently, when they failed in their object, they did much mischief, and when they succeeded in *forcing* out a perspiration, the temporary relief obtained by no means counterbalanced the previous increase of febrile excitement.

Now that the principles which govern the perspiratory process are better

understood, the long and endless farrago of sweating medicines is reduced to a few neutral salts, as the citrate of potash or acetate of ammonia, accompanied occasionally with small doses of antimony or colchicum. These, with *cool* diluent or acidulated drinks, are the only safe or salutary diaphoretics in fever; and probably act on the surface from its sympathy with the stomach. It is needless to state that the operation of this class of remedies is in perfect consonance with the principles I have endeavoured to maintain.

7. *Tonics and Stimulants, including Bark, Wine, Opium, &c.*—It may seem a little strange, that the most diametrically opposite plans have succeeded in fever, and been lauded to the skies by their supporters as infallible. Hence many have supposed that, were fevers left entirely in the hands of Nature, as many would recover as under the most skilful treatment. Whatever truth there may be in this, it is not equally correct that nearly the same proportion recover under all kinds of treatment. There is very little doubt but that, under *judicious* modern measures, not only a greater proportion recover from the graver types of fever, but a vast number of fevers are prevented from assuming the more dangerous forms. Neither need it be wondered at, that both stimulants and sedatives should occasionally prove useful in fever. We have seen that, when the excitability and vascular action are too great in one part of the system, they are deficient in others; hence the diffusive stimuli have the effect of rousing the torpid parts into action, but too often at the expense of the over-excited organs; and this has been the distinguishing feature of the Brunonian practice. Tonics and stimulants were also frequently necessary in the ultimate stages of fever, where early evacuations were not premised; because the system was exhausted by its own efforts or by injudicious remedies, and Nature required a stimulus at the close of the disease. But now it is found, after fatal experience, that by lessening reaction at the beginning, we preserve the powers of the constitution for ulterior efforts, and thereby obviate the necessity of stimulation at almost any period of fever.

To shew how dangerous it was to draw conclusions respecting *debility* from the salutary operation of stimulants in fever, the following example may suffice. From deranged balance of excitability, the heart and arteries become incapable of performing their office in a proper manner.—If their excitability be too great, they drive the blood with an impetus to the brain that may cause delirium: if their excitability be defective, the heart is incapable of unloading the venous system, and distention of the veins and sinuses of the head produces the same effect. Now, wine, if given *judiciously*, and to a certain extent, in the *latter* case, will impart such vigour to the heart as will enable it to unload the venous system of the brain, and thereby remove the delirium, without giving too much impetus

to the arterial system; but if the same medicine be exhibited in the former case, it will evidently increase the symptom it was intended to relieve!—In other words, some parts of the system being in a state of *torpor*, and others in a state of *irritability*, if stimulants be applied to the *former*, they *may* do good, but if to the *latter*, they *must* do harm. Hence the value and the necessity of discrimination in the practitioner; and the fatal effects of a *routine* practice.

It is, also, to be remembered, that a considerable number of those fevers usually styled *continued*, are, in reality, masked intermittents or remittents resulting from malaria; and in all this class of fevers, tonics and stimulants are far less injurious, and far more frequently necessary, than in others.

In some of the more protracted fevers of Europe assuming the typhoid and nervous type, the proper time for exhibiting the stimulating class of remedies requires the clearest judgment of the practitioner, and it is at these critical and decisive moments that real ability unfolds its acuteness of discrimination, and snatches the patient from the jaws of death; while the blundering routinist unconsciously signs his quietus!

Little need be said of the minor or subordinate remedies, as blisters, sinapisms, &c. Their operation is evidently to restore the balance of the circulation and excitability, by soliciting artificial determinations to superficial parts, with the view of relieving internal congestions or inflammations.

Finally, it is well known, that time alone will cure some mild forms of fever—that is, Nature, unassisted, will work the preservation of the constitution in her own way. Without attempting to pry too closely into the secret operations of Nature, one great process which she employs is obvious, namely, a general reduction of the whole body. No man ever came out of fever without a considerable degree of emaciation, and most people are greatly reduced. It is evident, therefore, that, however the other functions of the body may be deranged, that of *absorption* is in vigorous operation during the greater period of the fever. This reduction appears to me to be a very wise operation, and without which the patient would be cut off by starvation. The functions of digestion and assimilation are entirely at a stand in fever. The absorbents are, therefore, set to work, and the constitution feeds on itself for 14—21, or 30 days. When the fever ceases, appetite and digestion return, and then the abnormal absorption disappears. The body is again built up, and rapidly too, by the vigour of the digestive and assimilating organs.*

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* *Note to Sixth Edition.*—After a lapse of 20 years since the foregoing doctrine of fever was sketched out in the first edition; and after carefully watching the disease in various climates, since that period, I am unable to offer a more probable explanation of the nature, phenomena, and treatment of fever than what is stated above.

Endemic Fever of Bengal, commonly called the Marsh Remittent Fever.

VI.—The importance of this disease will not be questioned, when it is considered, that, in the small portion of the Hooghly running between Calcutta and Kedgeree, full three hundred European sailors (better than a fourth of the ships' crews) used to fall annual victims to its ravages!* The subject, therefore, is highly interesting, and must receive a considerable share of our attention.

There is no unmixed good in this world. The inundations of the Nile and the Ganges, while they scatter fertility over the valley of Egypt, and the plains of Bengal, sow with a liberal hand, at the same time, the seeds of dreadful diseases! Hence Cairo and Calcutta have severely suffered from the overflowings of their respective rivers. These consequences are not confined to tropical countries alone. Swamps and marshes, in all latitudes, give rise to intermittents and remittents, varying in degree and danger, according to the heat, rains, and other circumstances of the season. The deleterious influence of an atmosphere impregnated with marsh effluvia, on the human frame, is, in some places, astonishing. In the lower districts of Georgia, life is curtailed to forty or fifty years; while, in certain swampy situations of Virginia, (Peterborough) it is asserted that twenty years bound the contracted range of human existence! We may form some idea of the deleterious miasmata of the Campagna di Roma, when we learn from M. Bailly that the average annual mortality in the Hospitals of Rome, from 1809 to 1822, was 10,000, being a tenth of the whole number which entered those asyla of disease!

I have myself, in rambling through the villages of Beveland and Walcheren, been struck with the conspicuous marks of premature old age, which all, beyond maturity, exhibited; particularly among the peasantry. On enquiring the ages of decrepid wretches, withered, sallow, and apparently on the borders of four-score, I was surprised to find that fifty-five or sixty years were all they had numbered in these noxious fens. Often have I been asked by inattentive observers, why so unhealthy a country should present so great a number of very old people! But to return:—

There can scarcely be conceived a situation of greater anxiety and distress than that in which a young medical man, of any sensibility, is placed, on arriving at an unhealthy spot in a foreign climate, unfortified by experience, unaided by advice, and, as is too frequently the case, but scantily

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* Vide Capt. Williamson' East India Vade Mecum. The ground is much cleared about Diamond Harbour within the last twenty or thirty years, and less mortality is the consequence.—*Sixth Edition.*

supplied with books, containing local accounts of the country and its prevailing diseases. In such cases, he is forced to explore his way in the dark, agitated and alarmed by the mortality around him; a great share of which he attributes, perhaps with more remorse than justice, to his own misconduct, or ignorance of the proper treatment!

We arrived in the Hooghly, in the month of September, after a short run of little more than three months from England which place we left without the least knowledge of our ultimate destination. The fever in question was then making prodigious havoc among the ships' crews at Diamond Harbour and other parts of the river; nor were we long exempted from its visitation. All circumstances considered, I thought myself fortunate in having in my possession the works of two celebrated authors (Clark and Lind), containing a full account of this fever, drawn from personal observation on the spot. I accordingly studied them with great attention. In short, I was quite ready to grapple with this Hydra disease, and shew the power of medicine over this scourge of Europeans. Many days did not elapse before I had an opportunity of trying my strength against so formidable an opponent, and a very few trials convinced me I had calculated without my host, and that I must use other weapons than those furnished me by Drs. Lind and Clark, if I meant to be victorious in the contest. Dr. Clark's *description* of this fever, however, is so singularly chaste and correct, that, were I to draw the picture myself, I must either use his own words, or give a false portrait. I shall, therefore, only add a few observations of my own in a note, and recommend Dr. C.'s description to be carefully compared with that of the yellow fever in another part of the work.

"This fever attacked in various ways, but commonly began with rigors, *pain* and sickness at stomach, vomiting, headache, *oppression on the præcordia,* and great dejection of spirits. Sometimes without any previous indisposition, the patients fell down in a deliquium, during the continuance of which, the countenance was very pale and gloomy; as they began to recover from the fit, they expressed the *pain* they suffered by applying their hands to the *stomach and head;* and after vomiting a considerable quantity of bile they soon returned to their senses. Sometimes the attack was so sudden, and attended with such *excruciating pain in the stomach,* that I have been obliged to give an opiate immediately.*

"In whatever form the disease appeared at first, the pulse was small, feeble and quick—the pain at the stomach increased, and the vomiting

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* It is a little singular, that Dr. Lind, of Windsor, in his Inaugural Dissertation on this Fever, never once mentions "oppression on the præcordia,"—"pain at the stomach,"—or "fulness and tenderness in the epigastric region." I can safely assert, that I seldom saw an instance in which all of these were wanting—seldom, indeed, an instance in which they were not all present. It is true that this endemic is not always

continued. As the paroxysm advanced, the countenance became flushed—the pulse quick and full—the eyes red—tongue furred—thirst intense—headache violent; delirium succeeded, and the patient became unmanageable; but a profuse sweat breaking out in twelve or fourteen hours, generally mitigated all the symptoms.

"In the remissions, the pulse, which before was frequently 130, fell to 90. The patient returned to his senses, but complained of great debility; sickness at stomach, and bitter taste in the mouth. This interval, which was very short, was succeeded by another paroxysm, in which all the former symptoms were aggravated, particularly the thirst, delirium, pain at the stomach, and vomiting of bile. If the disease was neglected in the beginning, the remissions totally disappeared, and the skin now became moist and clammy; the pulse was small and irregular, the tongue black and crusted, and the pain at the stomach and vomiting of bile became more violent." It is needless to say that, from this period till death closed the scene, the features of this fever were such as characterise the last moments of all violent and fatal fevers.

The unfavourable terminations were generally between the third and seventh day, though, in some cases, I have seen it go on to the fifteenth or twentieth day: but visceral obstructions were almost always the consequence; and hepatitis or dysentery completed what the fever failed to accomplish. I may add that several cases occurred, under my own inspection, where there was a yellowish suffusion on the skin, as in the endemic of the West, with vomiting of matter bearing a considerable similarity to the grounds of coffee. This suffusion of bile, or yellow colour on the skin, is by no means an uncommon symptom in the fevers of the East, as will be shewn hereafter. The natives themselves frequently exhibit this appearance, when extensive epidemics prevail in the lower situations of Bengal, as appears by the following quotation from Captain Williamson. "Certainly (says this intelligent officer) it is common to see whole villages in a state of *jaundice;* and,

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arrayed in the same colours; but the abovementioned symptoms are so constantly attendant on fevers, in all hot climates particularly, that the omission of them is rather remarkable.

Dr. Lind mentions a symptom not noticed by Dr. Clark, and which I have often observed. After remarking that bile was frequently ejected both upwards and downwards, he says,—"Vomitus et dejectiones tamen *plerumque albi coloris erant,* calcis aquæ commistæ, vel lactis illius quod lactentes evomunt." Neither of them has mentioned delirium, as often the *first* indication of the fever. Many a time have I been called to see men, whom their messmates represented as "mad;" not in the least suspecting that it was the fever with which they were seized. This symptom generally happened among young men who were employed in boats, and who were not only more exposed than others to marsh effluvia, but to the fervency of the sun by day, and often to the dews and night air. A few instances likewise occurred where the patient attempted to jump over-board. This symptom is not very rare in bilious and other fevers, where there is great congestion or determination to the brain.

in some years, the ravages of the disease (marsh remittent) are truly formidable." A torpid, or, at least, irregular state of the bowels, almost invariably precedes this fever; unless in cases where the effects of the paludal effluvia are suddenly brought out, by exposure to the intense heat of the sun by day, and the chilling dews and fogs of the nights, among boats' crews. In these, of course, there were very few premonitory symptoms.

VII.—Causes of the Fever.

Sævamque exhalet opaca Mephitim sylva.—Æneid.

Drs. Lind and Clark dwell much on the putrefying animal and vegetable substances left on the miry shores of the Hooghly by each retiring tide; attributing a considerable share of malignity to the noxious exhalations arising from this source, during the intervals of high water, both by day and night. The argument is more specious than solid; and, perhaps, it is not founded on accurate or discriminating observation.

During the months of August and September, for instance, when fevers rage with their greatest violence, the rivers are swelled to the summits of their banks by the inundation, and the volume of water disgorged into the ocean is so immense, that the stream is perfectly fresh, and the flood tide scarcely felt at Calcutta; consequently, the rise and fall are comparatively insignificant. But in May and the beginning of June, on the other hand, when the rivers are shrunk far within their autumnal boundaries; when the heat is excessive; and when the tides are so rapid, that the *bore*, as it is called, rushes up past Calcutta, sometimes with the amazing velocity of *twenty miles an hour*, not entirely stopping till it reaches Nia-serai, thirty-five miles above the capital; then, indeed, at low water, each side of the river presents a broad shelving slope of mud and mire, covered with vegeto-animal remains in all stages of putrefaction, and disengaging the most abominable stench,—yet no ill effects whatever are produced by such exhalations.

For the solution of this phenomenon, we must look to the tides themselves, which, sweeping along these shores, every flood and ebb, never allow sufficient time for the extrication of that noxious effluvium which arises from the *stagnant surface* of marshes, either *partially* covered, or just deserted by *annual*, not *diurnal* inundations. Such marshes [and jungles which produce a similar effect] spread far and wide in every direction along the banks of this river, during, and for some time subsequent to, the rainy season; to these, therefore, and not to daily overflowed

places, are we indebted for all the sickness and mortality we so fatally experience.

Another circumstance may probably contribute its share in correcting these exhalations at the period alluded to.—During the inundation, the waters of this river are quite *fresh*, though turbid; whereas in the dry season, when the tides are strong, a considerable proportion of *salt water* comes up every flood, and renders the stream, even at Calcutta, so brackish, as to occasion smart bowel-complaints among those who drink of it at this time. A mixture of salt water with fresh, therefore, does not, as was supposed by Sir John Pringle, *increase* the noxiousness of marshy exhalations; on the contrary, we find, in this instance, that they are quite harmless, while rising from these extensive shores, when the water is considerably impregnated with marine salt. In respect to the marshes that run back from the river, they cannot, *during the inundation,* be more subject to flux and reflux than the river itself. The shores of all inlets and minor streams are under exactly similar circumstances to those I have stated of the Hooghly; and, finally, I may add, that it is the water of *inundations alone,* not tides, that ever bursts over the banks of the Ganges, to cover the adjoining plains; consequently, the *marshes* are not subject to diurnal flux and reflux. I have been the more particular on this point, in order to set in a clear light the *validity* of those reasons which induced Dr. Lind, of Windsor, to read the recantation of his medical faith in *lunar influence,* in favour of "*the increased effluvia disengaged from the shores and neighbouring marshes at each retiring spring tide.*" Never was the fable of "dropping the substance to grasp at the shadow," more completely exemplified than in this instance, which shews that "second thoughts are *not always* best." I much wonder that the ingenious Dr. Balfour, while lamenting the defection of his quondam supporter, did not adduce this unanswerable refutation, among others, of Dr. Lind's hypothesis.

In so luxuriant a climate as that of Bengal, and on so fertile an alluvion as the Delta of the Ganges, we may well suppose that every spot—almost every particle of matter, teems with animal as well as vegetable life. As the scale of existence descends, in the animal kingdom, the amazing circle of reproduction and decay is perpetually trodden by myriads of animated beings, whose ephemeral vitality has scarcely commenced, before it closes again in death! No sooner has the ethereal spark—the "divinæ particula auræ," deserted its tenement, than the *latter* is resolved, by the heat and moisture of the climate, into its constituent materials, and formed without delay, into other compounds. It is during this dissolution of animal and vegetable remains, preparatory to new combinations and successive reproduction, that a certain inexplicable something is extricated, which operates with such powerful and baleful influence on the functions of the human frame. This exhalation is capable of concentration, or rather accumulation; for when it is detained amid woods and jungles, as at this

place, and especially during the rainy season, when there are no regular breezes to dissipate it, and when the beams of the sun are obscured, except at intervals, by dense clouds, it becomes exceedingly powerful, as the annual mortality too plainly proves.

That the exhalation of these miasmata, and their diffusion in the atmosphere should be greater during the heat of the day than at night, when the air is raw and cold, appears more than probable; and yet an idea seems to prevail, that they arise from fens and marshes principally in the night. "The nature of an unhealthy, swampy soil," says Dr. Lind, "is such, that no sooner are the sun-beams withdrawn, than the *vapour emitted* from it renders the air raw, damp, and chilling in the most sultry climates." It is difficult to imagine how dews *descend* and vapours *rise*, at the same time. Nevertheless, it is certainly true, that the stench emitted immediately after sunset is much more perceptible to the senses than at any other period of the day. The reason of this is, that the shores and marshes *retain* their heat for some time *after* the rays of the sun are withdrawn, and, consequently, *continue* to emit vapours, which are not exhaled and diffused through the atmosphere, as by the sun and high temperature of the day; they therefore meet the descending dews and cool air, condensing and forming a thick fog, which hovers over the swamps, accompanied by a noxious and disagreeable odour. To this we must add, that the miasmata exhaled during the day, in all probability descend with the dews of the evening, and by meeting and combining with those that *continue* to be disengaged from their source, must form a concentration highly capable of affecting the constitution.—We accordingly find that four out of five of those who suffer are attacked, or receive the deleterious principle, at the period abovementioned. Experience has shewn that *marsh* effluvium, though by no means so limited as *human*, does not occupy a wide range: at least, it becomes innoxious at a certain distance from its source, in consequence of dilution. The circumstance mentioned by Dr. J. Hunter, and confirmed by subsequent observations—namely, that "the difference of a few feet in *height*, gives a comparative security to soldiers quartered in the same building," will be accounted for by the supposition which I have already stated, viz. *That as the miasms exhaled during the day descend in the evenings, they become more and more concentrated; till, meeting the exhalations from the still reeking marshes, a dense stratum of highly impregnated atmosphere is formed close to the surface of the earth.* Hence the superior degree of salubrity in the *upper* ranges of buildings; and, on the contrary, the extreme danger of sleeping on the ground in such places; many instances of which are recorded in the writings of Lind, Bontius, &c. I am the more inclined to believe that vegeto-animal miasmata descend with the dews, and are *then* more formidable than in their ascent by day, from a circumstance that occurred to myself in October 1805.

Having occasion to take a passage from Madras to Calcutta, in a foreign merchantman, at that time, I sat late on deck, one evening after our arrival in the Ganges, the vessel being at anchor a mile from the shore, and not a breath of wind moving in any direction. As the dews began to fall, I perceived, all at once, a faint heavy odour, to account for which I was much puzzled, as there was no breeze to waft any exhalation from the adjacent shores. My reflections were soon interrupted, however, by a sense of faintness, giddiness, and, at length, nausea, with which I was suddenly affected. I immediately went below, not a little alarmed, and fully persuaded that I was seized with the fever, whose effects I had so much reason to dread. On drinking some warm water, to clear my stomach, I took a dose of calomel and opium, and next morning, castor oil. Although no farther symptoms of fever occurred, yet I felt an unusual degree of lassitude and depression of spirits for some days after I got to Calcutta.

The same is often felt on crossing the Pontine marshes in Italy; and Dr. Moseley remarks, that he has felt a *shiver* while passing the swamps to the west of Kingston, especially near the *ferry*, before the sun had dispersed the vapours. The following remark of Dr. Lind's is favourable to the supposition of miasmata descending with the dews: "The first rains that fall in Guinea are commonly supposed to be the most unhealthy; they have been known, in forty-eight hours, to render the leather of shoes quite mouldy and rotten." "It has been further observed, that woollen cloths wet in those rains, and afterwards hung up to dry in the sun, have sometimes become full of maggots in a few hours." It is natural to suppose, that whatever exhalations arose and were floating in the atmosphere, previous to the rainy season, would descend with the first showers, on the same principles as the miasmata exhaled during the day descend with the dews of the night.

In the months of September and October, 1799, while the Leopard and Centurion, two of Admiral Blankett's squadron, were working up from Mocha to Juddah, along the Arabian coast, they were considerably harassed (the Leopard in particular) with a low fever, not of the remittent type, accompanied with great head-ache, weak, small, and quick pulse, pain at the stomach, and over the epigastric region, frequent bilious vomiting and purging, with uncommon debility and dejection of spirits. The days at this time were oppressively hot; the thermometer generally at 97°; the nights cool. But what was most singular, a copious fall of dew took place every night, *perfectly salt and bitter to the taste.* To this the fever was ascribed; and what corroborated the suspicion was, that the Leopard's crew slept exposed to the nocturnal vapours, and suffered ten times the sickness which occurred in the Centurion.

In the latter ship, no medicine was found to check the bilious purging and vomiting so well as calomel and opium. The addition of antimonial powder was afterwards made. When debility only remained, decoction of

bark, with nitrous acid, was found useful. In some cases, attended with great febrile stricture on the skin, the cold ablutions were used with success. In the Leopard some mortality prevailed.

This view of the subject leads to a practical inference of considerable utility, viz. that when necessity compels us to penetrate through those insalubrious woods, jungles, or marshes, we should select that point of time at which we are *least likely* to meet those miasms, whether in their ascending or descending state. This period seems to extend *from three to six o'clock in the afternoon;* that is, *after* the greatest heat of the earth and air, and, consequently, the greatest evaporation; and *before* the condensation and return of such exhalations as rose during the day, and which combine with those still issuing from the heated soil, for some time after sunset. It is but too well known, that the cool of the morning, of the evening, nay, in many instances, of the night, is generally pitched upon for wooding, watering, and other duties on shore, to the great risk of those concerned in such dangerous occupations.

An attention to the above rule [founded on facts as well as reasoning] would certainly be productive of much good, particularly when it is considered, that the human frame, during the portion of time above alluded to, is, perhaps, better fortified against the impression of marsh effluvium, or other debilitating causes, than at any previous or subsequent period in the twenty-four hours. The seaman makes his principal meal at mid-day; he is then served his allowance of wine or spirits, and if a couple of hours' rest is allowed at dinner, his energy and strength are much greater at three o'clock, than early in the morning or late at night. The European may object to this, by observing that the body and mind, recruited by sleep, are most vigorous in the morning. But I well know, from personal experience, that in tropical climates, and particularly during the rainy season, which compels all classes to pass the night between decks, the rest obtained from interrupted, I might say stifled sleep, is very trifling. Indeed a general languor, lassitude, and want of appetite prevail till towards noon, when dinner, wine, and an hour or two of repose, give a tone and activity to the system, which continue till the evening. This is the time, therefore, when we can resist the agency of marsh effluvium better than at any other, and, of course, should be selected, especially since it is at this period that the miasmata are most diffused through the higher regions of the atmosphere, and, consequently, less potent in themselves. The next three or four hours, viz. from six till nine or ten o'clock, appear to be pregnant with danger to those on shore. Within the tropics there is little or no twilight; immediately the sun withdraws his beams [six o'clock] every thing is involved in darkness; dews and vapours *fall* from the upper regions of the air, and exhalations still continue to spring from the tepid marshes to meet them. At this juncture, therefore, in the places and seasons alluded to, the stratum of atmosphere in immediate contact with the surface of the earth, must be

highly saturated with a principle but too destructive to human health and life; and the system is *then*, too, disposed to its reception, in consequence of the exhaustion produced by the heat and labours of the day, and the torpor induced by the coldness of the evenings.

VIII.—Predisposing Causes.

We now come to the Predisposing Causes, which are entitled to an equal degree of attention with that which has been bestowed on the remote or exciting.

These may be divided into mental and corporeal. Of the former, none are so conspicuous as the *depressing passions;* and of these, Dr. Clark informs us that FEAR produced the most sudden and striking effects, in aiding the remote cause of fever. This may, in some measure, account for the ravages which the yellow fever commits among those newly-arrived Europeans, who are prepossessed with the idea and dread of this terrible scourge.

I have, indeed, remarked that most of those who were of a timid disposition, and easily alarmed at the prevalence of the endemic diseases of the country, fell under their influence sooner than those of a contrary temperament. But grief, disappointment, and chagrin, were the depressing passions which universally induced the most decided and unequivocal predisposition to disease. I saw many strong and melancholy instances of this among that part of our crew which we impressed within sight of their own shores, and probably of their own habitations, when we were commencing our voyage to India. They were among the first and worst cases which I had under my care, and afforded ample proofs that mental despondency can accelerate the attack, and render difficult the cure of intertropical fevers in particular. I have since seen the influence of this predisposing cause on a large scale; not on the banks of the Ganges, but much nearer home—on the banks of the Scheldt.

When our army lay entrenched under the walls of Flushing, without any other defence from the sun, the rains, and the dews, than some brushwood or straw;—generally, indeed, with the humid earth for their beds, and the canopy of heaven for their curtains; still, with all these disadvantages, the animating prospect of success, the mental energy inspired by *hope*, united with corporeal activity, kept the whole army in health. When Flushing surrendered, however, and another object was not *instantly* held out for pursuit or attainment, a fatal pause took place, and a kind of torpor, or rather exhaustion, ensued, during which the remote cause of fever, viz. vegeto-animal miasmata, began to make some impression.—But when, from the ramparts of Batz, we clearly discovered with our glasses a strong boom

crossing the Scheldt from Fort Lillo—the surrounding country in a state of inundation, and various other insuperable obstacles between us and the "*ulterior objects*" of the expedition; then, indeed, the depressing passions, and some other predisposing or exciting causes, communicated a fearful activity to marsh effluvium, which rivalled, in its effects, any thing that has been seen in tropical climates!

It is an old complaint, that the medical topography, and healthy or unhealthy seasons of a country, are too often neglected in military and naval operations. Yet one would suppose that, within sixteen or eighteen hours' communication of London, every medical and political expedient would have been speedily devised and applied on such an emergency as this. But certain it is, that the army did not avail itself of some local advantages that presented themselves among these noxious islands. Walcheren, for instance, is bounded all the way round from Flushing by West Chapel, nearly to Camp Vere—two-thirds of its circumference, by a chain of sand hills, from twenty to thirty feet in elevation above the level of the interjacent plains. These hills were not only dry, but open to the westernly winds which blew from the sea, and were then very prevalent. On these, therefore, had the soldiers, who *continued* in Walcheren after the fall of Flushing, been *tented*, the elevated site, combining with other peculiarities, would, in all probability, have kept them entirely out of the range of those exhalations which covered the country below.

On the other hand, although Beveland did not present such a favourable situation to the rest of the army, yet, had they been provided with *tents*, the numerous mounds or embankments, which not only defend the island from the highest rise of the Scheldt, but intersect the country in every possible direction, frequently planted on each side with trees, and raised twelve or fourteen feet above the surface of the soil, would have afforded excellent encampments, where the men, under the immediate inspection of their officers, would have been secured from intemperance and other irregularities, the inevitable consequences of being quartered in towns and villages, often in churches, barns, and other damp, unhealthy habitations, throughout Walcheren and Beveland. But, unfortunately, *tents* were not considered a necessary part of the baggage on this expedition. The French General, too, having opened the sluices, and *partially inundated* the country round Flushing, increased the force of the endemic. Indeed, the road leading from the last-mentioned place to Middleburgh, might at this time vie, in respect to insalubrity, with any through the Pontine fens of Italy. Lenity towards the *inhabitants* arrested the progress of the inundation before it was complete; policy in guarding the health of *our own army* would, perhaps, have suffered it to continue till the cessation of the autumnal heats, and the commencement of cold weather and frost.

Nothing could more clearly prove the limited range of marsh effluvium, than the contrast between the health of the navy and that of the army.

Although the ships were distributed all along the shores of Walcheren and Beveland, from Flushing to Batz, most of them within a cable's length of the banks, yet no sickness occurred, except among such parts of the crews as were much employed on shore, and remained there during the nights. Most officers of ships, and many of the men, were in the habit of making excursions through all parts of the islands by day, with complete immunity from fever. The night was here, as in sultry climates, the period of danger.

But, to return. One would suppose that, in a tropical climate, where Nature is ever arrayed in her gayest livery, the cloudless skies above, and exuberant fertility around, would conspire to impart a degree of elasticity (if I am allowed the term) and exhilaration to the mind, similar to what we feel in Europe, at the approach of Spring or Summer. The reverse of this is the case. The animal spirits are, in general, below par; and the same cause of grief or disappointment, which in England would be borne with philosophical resignation, or perhaps indifference, will, in India, greatly predispose to all the diseases of the country, and very probably terminate the mortal career of the unhappy object.

The following melancholy facts are strikingly illustrative of this remark. His Majesty's ship Russel (74) sailed from Madras on the 22d October, 1806, and arrived at Batavia on the 27th November; the crew healthy, and their minds highly elated with the sanguine expectations of surprising the Dutch squadron there. Such, however, was their sudden disappointment, and concomitant mental dejection, on missing the object of their hopes, that they began immediately to fall ill, ten, twelve, or fourteen per day, till nearly 200 men were laid up with *scurvy*, scorbutic fluxes, and hepatic complaints! Of these, upwards of 30 died before they got back to Bombay, and more than 50 were sent to the hospital there. The Albion did not fare better—the Powerful fared worse: so that in these three ships only, in the short space of a few months, *full* 100 *men died on board,* and double that number were sent to hospitals, many of whom afterwards fell victims to the diseases specified; aggravated, and in a great measure engendered, by mental despondency.

Numerous are the instances of a similar nature, though on a smaller scale, which I could relate; but the above specimen is sufficient. The converse of this position is equally surprising; thus, success or good fortune will as forcibly counteract, as the contrary will predispose to, the malignant effects of climate. A familiar example will elucidate this.—Two ships, under equal circumstances, sail from Bombay, on a five months' cruise off the Isle of France. One of them takes a valuable prize, while the other, with every effort and vigilance, is quite unsuccessful. The minds of the former crew are now perpetually employed in building, "castles in the air," and forming the most extravagant anticipations of enjoyment on their return to port. This ship's company, without the aid of a single bottle of lime-juice, or pot of spruce, will come back to Bombay, at the end of the

cruise, in health.—Not so the other: chagrin, envy, (for, after all the *poetical* portraits that are drawn of our noble tars, they are both envious and jealous at times, like other folks) and various depressing passions shew themselves here in the ugly shapes of scurvy, ulcers, and fluxes; so that, in spite of all the artificial checks from lemon-juice, sugar, porter, and even NOPAL itself, they are forced to Madagascar for refreshments, or else return with the other ship to Bombay, in a deplorable condition.

Here, however, the scene shifts again; for Hygeia is as fickle as Fortuna. The crew of the successful ship having shared their prize-money, "Balnea—Vina—Venus" become the order of the day; and, for a short time, they are at the summit of human happiness! But in a few weeks, on *leaving* port, this ship's company will exhibit as long a list of fevers, dysenteries, and venereals, as the other did of scurvies, ulcers, and fluxes, on *arriving*. Thus prize-money, or rather the hope of prize-money, is one of the most potent antidotes to disease among sailors at sea, but the most certain bane of their health on shore.

This mental despondency may be attributed partly to physical, and partly to moral causes. I have already hinted that derangements in the *hepatic* and *digestive*, very soon affect the *mental* functions; so, on the other hand, the depressing passions speedily derange the biliary secretion, digestion, and peristaltic motion of the intestines, consequently disposing the liver, stomach, and alimentary canal to disease, as well as inducing general debility throughout the system.—This sufficiently accounts for the phenomenon; but it is also to be considered, that grief and disappointment must be, *cæteris paribus*, more poignant in India than in England; since the loss of friends or relatives is more felt in proportion to the small number we possess; and frustrated expectations will, of course, be more galling, on account of the previous sanguine hopes which always accompany a foreign, and particularly an Indian speculation. We may, therefore, lay it down as an axiom, that, in a tropical climate, the depressing passions above alluded to, operate more immediately on those organs which, under all circumstances, are the principal sufferers in the diseases of the country; viz. that they diminish the mental energies, or sensorial power, and impair the functions of the liver, stomach, and intestinal canal.

Within the torrid zone, Philosophy seems to direct her influence, and reason its arguments, in vain, against these powerful disorders of the mind! Their frigid tenets are more efficacious beneath the gloomy skies of Europe. Religion, indeed, frequently asserts her superiority here, as well as elsewhere, and, in conjunction with some pursuit or employment, mental or corporeal, will be found the best shield against the demon of despair, and, ultimately, the pangs of disease.

The destructive effects of intemperance, as a predisposing cause, are equally conspicuous, and I might say peculiar, in a tropical climate; for

the injuries it occasions in Europe, great as they are, bear no proportion to those which we witness in the East or West Indies. Whether spirituous and vinous potations act as stimulants or sedatives, or both in succession, we need not stop to inquire, since the final result is universally allowed to be debility. From the temporary increase of excitement in the system, and energy in the circulation, it is not impossible that the biliary secretion is for a short time augmented, and of course vitiated, by strong drink. This supposition is strengthened by the diarrhœa crapulosa which we frequently observe succeeding a debauch. But the great mischief seems to arise from a torpor communicated to the liver, by which the secretion of healthy bile is not only greatly diminished in quantity, as well as obstructed, but deteriorated in quality; and hence the way is paved for fever, dysentery and hepatitis. The debility of the stomach, too, occasioned by the climate, is further increased by inebriety; and this atony is readily communicated to the liver, which bears the onus of disease in all hot climates. The truth of these observations is amply exemplified among the crews of ships, when they have liberty to spend a few days at Calcutta, or go ashore, indeed in any part of India, where intoxicating liquors are to be procured. During the indirect debility succeeding these debauches, the endemic of the country or port makes rapid strides among these deluded victims, converting what they erroneously conceived an indulgence, into the greatest evil that could have befallen them.

For obvious reasons, intemperance in eating is little less destructive than the other species; since an overloaded stomach, which has previously been weakened, will of itself excite a temporary fever, and consequently predispose to that of the country.

That fatigue, especially during the heat of the day, becomes an exciting cause of this fever is well known to those who have observed its effects among the seamen employed in stowing the saltpetre, or loading and unloading the Company's ships at Diamond Harbour. Where those laborious occupations *must* be carried on by Europeans, they certainly should not take place between eleven o'clock and four in the afternoon; the interval ought to be dedicated to dinner, rest, and light work under the awnings.

A very common, and powerfully predisposing cause of this fever, has seldom been adverted to, though highly deserving of attention.—I mean those licentious indulgences which are but too easily procured, and too frequently practised on the banks of the Ganges, and in most other parts of India—I may say of all tropical climates! I have seen many melancholy instances of their pernicious effects; and, therefore, it is incumbent on commanding officers of ships, to keep as strict a curb as possible on the men, during the sickly season, and on no account whatever allow them to straggle through the villages, where inebriety, and that, too, from a

very deleterious species of drink, is an inseparable accompaniment to the illicit amours abovementioned. In every region virtue is its own reward; but within the torrid zone, its breach is more signally punished than in any other.

The last predisposing cause which I shall mention, is the influence of the sun and moon. However sceptical professional men in Europe may be, in regard to planetary influence in fevers, &c. it is too plainly perceptible between the tropics, to admit of a doubt. I have not only observed it in others, but felt it in my own person in India, when labouring under the effects of obstructed liver. It is a certain fact, that if we attend minutely to the state of our own frames and sensations, two, if not three, slight febrile paroxysms, may be detected in the course of each diurnal revolution of the earth, independent of those which succeed full meals. In high health we may not be able to distinguish more than the nocturnal paroxysm, which commences about seven or eight o'clock in the evening, and is not over till two in the morning. This is the cause of that furred tongue, which all may observe on getting out of bed, more or less, according to the degree of the paroxysm; and it likewise explains the evening exacerbation of fevers in general. But valetudinarians will feel, about mid-day, another slight febrile accession, similar to the preceding, except in degree; and in some instances a third, but still slighter one, is felt between eight and ten o'clock in the morning. In India I have felt the two former very distinctly, and particularly at full and change, when I used to be affected with tremor, a sense of weakness, and sometimes a dimness of vision about mid-day, succeeded by a certain quickness and irritability of pulse, which would continue for an hour or two. I was so well aware of this, that I made a point of keeping myself quiet and as cool as possible, about the above-mentioned period; since any exertion at that time, in the heat of the sun especially, increased the symptoms which I have described in a very considerable degree. I believe this is the case with most people more or less, and accounts for the general complaint of faintness about twelve o'clock in the day, which is relieved by a glass of wine, or other refreshment. I found the cold bath, where I could conveniently apply it, almost entirely *prevent* this paroxysm, and hence the utility of bathing when the sun is at its greatest altitude.

The difference between this and the yellow fever of the West has been always noticed, but, in my opinion, never adequately accounted for; and the investigation of this discordance is certainly interesting, since the same general causes, both remote and predisposing, are allowed to operate equally, or nearly so, in both hemispheres. First, then, let me observe, that the average space which a ship traverses, between Spithead and the Ganges, is 14,000 miles. Secondly, that in this voyage we run twice through the tropics; first from Cancer to Capricorn, and afterwards from Capricorn back to Cancer again; besides a great deal of oblique sailing in the vicinity of the southern tropic. During the period of time necessary for this per-

formance, the human frame has the best possible means of accommodating itself to the change of climate; viz. a more steady range of temperature, and of a lower degree, than that of the ultimate destination; together with an atmosphere untainted with any noxious exhalation. In addition to these, the regular hours imposed on all classes, in ships proceeding eastward, the consequent habits of temperance acquired, and, lastly, the paucity of luxuries which pretty generally attends a protracted voyage, especially the last weeks, sometimes months of it, all combine to lower the tone of the constitution, and impart to it a considerable degree of assimilation before the period of danger arrives. Thus the stomach and bowels will become somewhat accustomed to the increased secretion of bile, and even this last will be less profuse, as we are more inured to the high ranges of temperature, following the same laws which regulate the perspiration.

Let us contrast this with a transatlantic voyage. The European, "full of flesh and blood," [to use a vulgar, but not inapplicable expression] embarks for the West Indies in a transport or other vessel, where regularity and order are by no means conspicuous.* As he is under little control, and generally, supplies a great proportion of his own fare, he endeavours to guard against any deficiency in that important point; in short, good English viands smoke daily on the festive board, while sufficient potation—"to keep the pores open," is steadily applied; till, after a few weeks' run, he is launched at once into a tropical climate, and immediately landed, "with all his imperfections on his head." It is true that, when ashore, the facility of procuring the "*diffusible stimuli*" need not be much insisted on, since, unfortunately, the *arrack* of the East is equally easy of access to the men, as the *rum* of the West. But unquestionably the bad effects will be greater in the latter case, for the reasons adduced above.

With respect to officers, and the better classes of society, on landing in the western world, they are destitute of many powerful shields which are pretty generally interposed between Europeans in the East and the burning climate. In the former case, we may look in vain for the palankeen, the budgerow, the punka, the tatty, and the light, elegant, and cool vestments of India, together with the numerous retinue of domestics, anticipating every wish, and performing every office that may save the exertion of their employers. The untravelled cynic may designate these luxuries by the contemptuous epithet of "Asiatic effeminacy;" but the medical philosopher will be disposed to regard them as rational enjoyments, or rather as salutary precautions, rendered necessary by the great difference between a temperate and torrid zone. Nor are these *dulcia vitæ* the exclusive property of the higher classes in India. The European soldier is permitted to intermarry with the native Hindostannee nymph; and, whether married or not, he has

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* I allude principally to troops.

generally a domiciliated *chere amie*, who cooks, washes, and performs every menial drudgery for *massa*, in health, besides becoming an invaluable nurse when he is overtaken by sickness.

Under the privation of these advantages, can we wonder at the effects, which exposure to all those causes, described as operating in Bengal, must produce on the full, plethoric habit of an Englishman, only four or five weeks from his native skies before he debarks on the burning shores, or insalubrious swamps and vallies of our western colonies ?

The more prominent distinctive features of the transatlantic fever, yellow skin and black vomit [though, by the bye, they are frequently *absent* in this, and *present* in the eastern fever,] may I think be attributed, in some measure, to the more violent action in the hepatic system, and superabundant secretion of *vitiated* bile, which, by the ceaseless vomiting, is thrown out in deluges on the duodenum and stomach, deranging their structure, while regurgitation in the blood suffuses the skin.

It is not meant to infer from hence, that the febrific miasms are exactly the same in the East and in the West; experience proves the contrary, as will be shewn in the Section on Batavian Endemic. I only mean to say, that the expression of their effects, on the biliary organs in particular, may be considerably modified by the circumstances above detailed. Neither do I suppose that, in the last stages of black vomit, the matter ejected is bilious; but I am confident that the gastric derangement is, in a great measure, occasioned by the quantities of acrid, vitiated bile, poured from the liver on the stomach, during the vomiting in the early stages of the disease. Hence, to check the gastric irritability early is a most desirable object.

The stomachs of newly arrived Europeans in the West Indies will, for the reasons detailed above, be much more liable, also, to inflammatory action. This, and the more violent orgasm in the hepatic system, appear to be the principle distinctive features in which the fevers of the two hemispheres differ; and are, I think referable to the aforesaid causes.—These considerations also account for the more decisive system of depletion which is necessary in the western endemic; and for the inutility of mercury till the inflamatory action is completely controlled. In the Eastern Hemisphere, on the other hand, where the biliary apparatus is very generally in a state of derangement anterior to febrile attacks, the union of mercury with venesection is a rational measure.

In respect to the *yellow colour*, in the highly concentrated endemic fever of the western world, there is reason to doubt its cause being a simply *bilious* suffusion. It would appear in many cases to be a broken down state of blood—or a stagnation in the capillary system, such as we see after contusions.

A practical point of much importance remains to be noticed; namely, whether or not the fevers in question are contagious. It is lamentable to

observe the discordance of medical opinions on a question that, at first sight, might seem so easily determined. Thus, Clark, Lind, Balfour, Chisholm, Blane, and Pym, are positive in the affirmative; while on the other hand, Hunter, Jackson, Moseley, Miller, Bancroft, and Burnett, are as decided in the negative!

Yet here, as in most other instances, truth lies between the extremes. As far as my own observations and judgment could guide me, I have been led to conclude, that the endemic fevers alluded to are *not* contagious till a certain number of patients are confined together, under certain circumstances, when the effluvia *may* render them so. If, for instance, a man is seized with fever, from greater predisposition, or from greater exposure to the causes enumerated than his companions, he will not communicate the disease to another, who may sleep even in the same chamber, where common cleanliness is observed. But, on the other hand, if great numbers are attacked at the same time, and confined in the sick berths of ships, or in ill-ventilated apartments, in hammocks, cots, or filthy beds, it is nearly certain that a febrific atmosphere will be formed, [without an attention to cleanliness and ventilation scarcely compatible, or, at least, hardly to be expected, in such situations,] which spreads a disease, *wearing the appearance of the prevailing endemic*, but having a dangerous character superadded, namely, the power of reproducing itself in other subjects, both independent of, and in conjunction with, the original endemical causes.

In what manner, or through what channel, it is conveyed to the sensorium, so as to produce its effects on the constitution, we are nearly ignorant. A general idea prevails, that the stomach is the medium through which the matter of contagion acts; and, by analogy, that marsh miasmata take the same course. But when we consider that, at each inspiration, the atmosphere impregnated with this principle is largely applied to the delicate texture of the lungs, it is not difficult to conceive, that it may pass into the blood [if it is in any case absorbed] as readily as oxygen. There are, besides, the schneiderian, and other membranes of the nares and fauces, to which it must have constant access, while there is but one way for it to pass into the stomach, viz. along with the saliva or food. Further, when we see this principle, in a concentrated state, produce fever in a very few hours, with high delirium, can we suppose that it enters the system by the circuitous route of the alimentary canal and lacteals? If it be said that it acts through the medium of the nerves of the stomach, why not through that of the olfactory, which is a shorter road? Indeed, from a near view of its *effects*, there is every reason to suppose that the brain and nervous system suffer the first impression and shock. To those *effects* we are to direct our attention.

I believe it is nearly an unanimous opinion, at present, that both marsh and human effluvia are directly sedative or debilitating in their nature. Dr. Rush, indeed, uses the term "stimulus of contagion" in

almost every page of his work on Yellow Fever; but, like the more celebrated "stimulus of necessity," it may be quietly laid in the "tomb of all the Capulets." By Dr. Jackson, the cause of fever is compared to electricity. "It seems to accumulate in the system by a regular but unknown process: in a certain state of accumulation, it seems to explode in a manner similar to the explosions of electricity."* The delirium and violent action early apparent in the jungle fever, might countenance the idea of a stimulus, and that the subsequent debility was of the *indirect* kind. I have heard this opinion maintained on the spot, by medical gentlemen; but if we narrowly inspect the train of morbid symptoms, we find more of *irregular* than *increased* action; more of apparent than real strength. If we carefully observe the delirious patient, writhing and struggling under the first impression of this cause, we find the efforts not only momentary and less effective than healthy exertions, but accompanied, even at the instant, and immediately succeeded by tremor and other marks of debility.—The premonitory symptoms, too, are indicative of decreased sensorial energy. The mind is wavering and unsteady; the appetite languid; the secretions, particularly the biliary, diminished; and the bowels torpid. Notwithstanding the determined phraseology of Dr. Rush, therefore, we may still adhere to the opinion of the venerable Cullen, that marsh, as well as human effluvium, is *sedative*. Dr. Jackson, indeed, will not allow it to be either stimulant or sedative, but a kind of *irritant;* yet he gradually slides into the admission of its sedative nature. "It, however, appears, from the most general view of things, that the febrile cause is a cause of irritation, disturbing, but *not increasing* in a natural manner, the action of the moving fibre. On the contrary, interrupting, impeding, and, as it were, *suspending* the operations essential to health and life; by which means the expression of its effects principally consists in *debility and impaired* energy."†

The space of time which intervenes between the application of this poison to the system and its ostensible operation in the form of fever, depends on the degree of its concentration, and the predisposition of the patient. It will, for instance, be found in some places, so powerful, that a man in perfect health, by remaining on shore during the night, in marshy situations, and wet or autumnal seasons, shall have the fever violently the next day, and die on the third or fourth. On the other hand, it may be applied in so dilute a state, as to require eighteen, twenty, or even thirty days,‡ to bring on fever; and even then, perhaps, only in consequence of some of the numerous predisposing or *auxiliary* causes concurring to enable the *original* to develop itself. If we take the medium of these two extremes, we shall have the ordinary period, viz.

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* Outlines of Fever, p. 274. † Ibid. p. 253.

‡ Dr. Jackson says two months, and Dr. Bancroft nine or ten.

twelve or fourteen days, which elapses between the reception of vegeto-animal miasmata into the body and their manifestation, in the shape of actual disease.

We see, then, this important agent greatly varying in force; and from standing occasionally the unaided *principal*,—the "instar omnium," in the production of fever, dwindle away till it can scarcely be distinguished, at least not prominently so, among the train of *auxiliaries*.

Such being the case, is it not probable that where the *latter* are numerous or powerful, they may, in some instances, induce the aforesaid disease, without the assistance of marsh exhalation?

TREATMENT.

In respect to the cure, Dr. Clark asserts that "nothing is more indispensably necessary, in the beginning, than to cleanse the intestinal tubes by gentle *vomits* and purges." * * * * * "As soon as the intestinal tubes have been thoroughly cleansed, the cure must *entirely* depend upon giving the Peruvian bark, in as large doses as the patient's stomach will bear, without paying *any regard to the remissions or exacerbations of the fever*." Such are the plain and easy instructions which Drs. Clark and Lind have left for our guidance in this fearful endemic. They certainly are not, apparently, difficult to follow; and Heaven knows, I endeavoured, most religiously, to fulfil every iota of their injunctions; but with what success a single case will shew.

A young man, of a good constitution, in the prime of life and health, had been assisting, with several others, to navigate an Indiaman through the Hooghly. The day after he returned, he was seized with the usual symptoms of this fever. I did not see him till the cold stage was past; but the re-action was violent—the headache intense—skin burning hot—great oppression about the præcordia, with quick, hard pulse—thirst and nausea. An emetic was prescribed, and, towards the close of its operation, discharged a quantity of ill-conditioned bile, both upwards and downwards: soon after which a perspiration broke out, the febrile symptoms subsided, and a remission, almost amounting to an intermission, followed. I now, with an air of confidence, began to "throw in" the bark; quite sanguine in my expectations of soon checking this formidable disease. But alas! my triumph was of very short duration; for in a few hours the fever returned with increased violence, and attended with such obstinate vomiting, that, although I tried to push on the bark through the paroxysm by the aid of opium, effervescing draughts, &c. it was all fruitless; for every dose was rejected the moment it was swallowed, and I was forced to abandon the only means by which I had hoped to curb the fury of the disease. The other methods which I tried need not be enumerated: they were temporizing shifts, calculated, in medical language, "to obviate occasional symptoms."

The truth is, that I knew not what to do; for the sudden and unexpected failure of that medicine on which I was taught to depend, completely embarrassed me, and before I could make up my mind to any feasible plan of treatment, my patient died, on the third day of his illness, perfectly yellow—vomiting, to the last, a dark fluid, resembling vitiated bile, and exhibiting an awful specimen of the effects which a Bengal fever is capable of producing, in so short a period, on a European in the vigour of manhood!

With feelings more easily conceived than described, I had the body conveyed to a convenient place, in hopes that dissection might afford some clue to my future efforts. On laying open the abdomen, I was surprised to find the liver so gorged, as it were, with blood, that it actually fell to pieces on handling it. Indeed, it appeared as if the greater number of the vessels had been broken down, and almost the whole of the interior structure converted into a mass of extravasation. The gall-bladder contained a small quantity of bile, in colour and consistence resembling tar, and the ductus communis choledochus was so thickened in its coats, and contracted in its diameter, that a probe could scarcely be passed into it. Marks of incipient inflammation were visible in some parts of the small intestines, and the internal surface of the stomach exhibited similar appearances. The thorax was not examined, on account of the time taken up in getting at the brain. Marks of turgescence, in the venous system of vessels particularly, were there quite evident, and more than the usual quantity of lymph was found in the ventricles, but no appearance of actual inflammation.

This case requires little comment. It is pretty clear that it would have required some ingenuity to devise a more injudicious mode of treatment than that which I pursued. But it taught me an important lesson—it opened my eyes to my own folly, and, *pace tantorum virorum*, to the oversights of my teachers. It is but too true, that we are nearly as reluctant in acknowledging our failures, as we are forward in blazoning our successes. In so uncertain a science as that of medicine, this has always been a considerable obstacle to its progress and improvement; since, while we read of the great good fortune of others, and the surprising cures they have performed, and then find our own so far deficient in that respect, even when we are carefully treading their steps, we despond, and become exceedingly sceptical in regard to the truth of those statements. These reflections are not meant to bear on the veracity or candour of Dr. Clark, both of which I highly respect:—but as he has only published two unsuccessful cases—"in the most malignant fever he had ever seen in any part of the East Indies,"—viz. the Bengal fever, it may justly be questioned whether he would not have done more good by detailing a greater proportion of the fatal terminations, than by confining himself to two solitary instances, without a single dissection. A careful perusal of the first of

these that occurs on the list, (Henry Pope, case 6,) will probably convince the reader that I was not the only person who had mistaken the nature of the disease.—In fact, the determination to the liver and the brain is perfectly evident from the beginning to the end of this case; and although no dissection took place, we cannot, for a moment, doubt the appearances which it would have exhibited.

The impression made on my mind, by the dissection on one hand, and the perusal of Dr. Clark's case (Henry Pope) on the other, determined me to try venesection, notwithstanding the dreadful accounts which Dr. C. himself gives of its fatal effects. I had now several down with the fever; and must confess it was with a trembling arm and palpitating heart that I first opened a vein, expecting every instant to see my patient die under my hands. He did not die, however; nay, he seemed evidently relieved, but the bad symptoms soon returned, and the bleeding was repeated, with brisk evacuations. He recovered.

I now carried the evacuating plan with a high hand, and with much better success than I expected. Fortunately for my patients, a great majority of them were fresh from Europe, and high in previous health and strength; these recovered wonderfully, after bleeding and evacuations, though not always.

But there was on board a class of men whom we had pressed out of ships on their return from India, who had experienced, not only the influence of the climate, but of depressing passions, arising from "hope deferred," and the galling disappointment they must have felt, while treading back their steps to a distant country, after they had been on the very point of mingling with their friends and relations at home! These required a more discriminated mode of treatment. Evacuations at the very beginning were necessary; but something more was requisite, to clear the congestions from the head and liver. The fluids here, to use a simile, were too stagnant to drain off, of their own accord, even when a sluice was opened—they required propulsion. It would be humiliating to myself, and, perhaps, uninteresting to my readers, to enumerate the many glaring blunders which I committed, and the false conclusions which I drew, before I arrived at any thing like a steady, and even tolerably successful, method of checking this Herculean endemic.—Let those whose eagle eye and towering intellect can penetrate, at a single glance, the secrets of Nature, and curb, with ease, the reins of impetuous disease, thank their stars for such powers and privileges. I confess that I have never enjoyed them!

But to return to our subject. The first symptom that claims our most serious attention in this disease, is that irritability of the stomach, accompanied by a distressing vomiting. Till this is allayed, nothing can be done towards the cure, by way of medicine. Now, venesection has considerable effect in procuring alleviation, even of this symptom. But the trifling manner in which it is too often performed, when it it ventured on at all,

does more harm than good. *Bleed boldly and decisively, till the head and præcordia are relieved, or draw no blood whatever; and let the operation be performed at the very commencement of the paroxysm.*

While this is doing, a scruple of calomel, with half a grain or a grain of opium, should be immediately given; this will act like a charm on the stomach, at the same time that it tranquillizes the nervous and vascular disturbance. I shall prove, in the course of this Essay, what, indeed, is well known to many of my brother officers who have served in India, that twenty grains of calomel will act as a *sedative*, and, so far from griping and producing hypercatharsis, it will soothe uneasiness, and rather constipate than purge. On this account, in the course of a few hours, when the vomiting is assuaged, some purgative must be given, as cathartic extract, with calomel, castor oil, or salts, which will seldom fail to bring away a most copious discharge of intolerably fetid, bilious, and feculent matter, to the unspeakable relief of the head and epigastrium. To facilitate and accelerate this most desirable object, purgative glysters should be thrown up. The more copious the catharsis, the less danger there will be of the return of vomiting. If there be now a return of any of those dangerous symptoms, intense headache, delirium, or pain in the epigastric region, no apprehension need be entertained of the lancet once more,* together with leeches to the epigastrium. The fear of debility and putrescency still paralyzes the arms of medical men in hot climates, notwithstanding the clearest evidence in favour of general and local bleeding, particularly where the subject is lately from Europe, and not broken down by the climate.

Immediately after the operation of the cathartic, the main-spring of the cure must be acted on. For this purpose, from five to ten grains of calomel, according to the urgency of the symptoms, combined with antimonial powder, should be exhibited every four or six hours, till moderate ptyalism is raised, or at all events, till a mercurial odour is felt in the breath, or the secretion rendered natural; when, in nineteen cases out of twenty (I might say forty-nine out of fifty), there will be a remission of all the febrile symptoms, and safety secured.—This has appeared to me the *sine quâ non*, in the medical treatment of this fever, as well as many other fevers in the East. Let it be remembered that I am distinctly treating of fevers of the Eastern Hemisphere. The fevers of the Western tropics require, for reasons which will hereafter be pointed out, a modification of treatment somewhat different, especially as it regards the administration of mercury.

It is hardly necessary to remark, that emetics are exceedingly doubtful, if not prejudicial, medicines in this endemic, since gastric irritability is one of the most distressing and difficult symptoms with which we have to contend. Yet many judicious practitioners, in the Navy especially, still em-

* The jugular vein, where the head is oppressed, will be the best exit for the blood.

ploy them, as will be seen hereafter; my own experience, however, and observations are decidedly against them.

But, on the other hand, cathartics are eminently useful. There is, in this fever either an obstinate costiveness, or dysenteric purging; natural fæces, tinged with healthy bile, will rarely be seen; when such can be obtained by purgatives, a great and evident advantage is gained. It may seem strange that I should recommend calomel and opium anterior to the administration of purgatives; but independent of the necessity which there is of allaying the irritability of the stomach, whoever will compare the discharge procured by cathartics given *previously* to the calomel and opium, with that which follows the subsequent exhibition of them, will decide in favour of the latter plan.

Once every day, then, the dose of calomel, usually given every four or six hours, should be conjoined with ten or fifteen grains of ex. colocynth. com. jalap, or an ounce of castor oil. These will be sure to bring down a copious alvine evacuation, composed of highly vitiated bile and fæcal sordes, that had been lurking in the convolutions of the intestines and cells of the colon, during that torpid state of the bowels which generally precedes the attack of fever.—The operation of the cathartic may be accelerated by purgative glysters.

This will greatly relieve the oppression and tension of the epigastrium, as well as the headache; indeed, so striking is the amelioration of symptoms, after these intestinal evacuations, that, in two or three instances, I was tempted to follow them up, and try if they might not supersede the necessity of impregnating the system with mercury. I trode here on tender ground; I was forced to measure back my steps, and have recourse in the end to that powerful and invaluable medicine, but in one case it was too late! Warned by this, whenever I combined a purgative with the calomel afterwards, I directed a mercurial friction or two to be employed during their operation, to prevent a halt in the pursuit of my ulterior and principal object—a moderate ptyalism.

In the mean time, while things are in this train, there are several objects which, though of a secondary consideration, the prudent practitioner will do well to keep in view. In the first place, the patient should be removed to the most airy and cool part of the ship or house; he should be made perfectly clean; and as there is, in nine cases out of ten, a great determination to the brain, his feet may be immersed occasionally in warm water. His head should be elevated, shaved, and numerous folds of linen or cotton, moistened with vinegar and water artificially cooled, kept constantly applied to it. Local bleeding, too, from the head, by leeches or cupping, should be often practised.

Sir James M'Grigor remarks, in his Medical Sketches, that the cold bath did not succeed in the fevers of India.—"On my arrival there (says he) I tried it in several cases, but it failed. This fever is commonly of the

remittent type; there is much reaction; it seems, in most cases, *symptomatic of liver affection, and often terminates in hepatitis.*" There is some obscurity in the latter part of this passage; but at all events, Sir James M'Grigor cannot allude to the fever under consideration; for, although the function of the liver, as I shall hereafter endeavour to prove, is, in this, and, perhaps, in most other fevers, *affected;* yet it would be carrying a theory to extremes to assert, that the Bengal Marsh Remittent, confessedly produced by paludal effluvia, in conjunction with heat and moisture, was, "in most cases *symptomatic* of liver affection." It is probable that Sir James M'Grigor had not an opportunity of seeing *this* fever; as his observation, in regard to "liver affection," applies more strictly to those fevers denominated "Bilious," which are prevalent at Bombay, the Coast of Coromandel, and other elevated parts of India, in which Sir James M'Grigor served.

How far the cold affusion, in these *last* fevers, may be applicable, this is not the place to enquire; but, in the Bengal Remittent, it has been practised, time immemorial, among the natives themselves, many a century before a Jackson, a Wright, or a Currie, ever thought or wrote on the subject, as the following quotation from a gentleman *out of the profession,* and who, of course, has no other object than truth in view, will prove.—"We must, however," says Captain Williamson, author of Oriental Field Sports, &c. "do the natives the justice to allow, that the refrigerating principle, lately adopted by some of our leading physicians, owes its origin solely to the *ancient practice* of the Brahmans, or Hindoo priests, of whom the generality affect to be deeply skilled in pharmacy. I believe that, if taken in time, few fevers would be found to degenerate into typhus, and that very seldom any determination towards the liver, in acute cases, would occur, were the refrigerating course to be adopted. Often have I known my servants, when attacked with fever, to *drink cold water* in abundance, and to apply *wetted cloths to their heads,* with great success. The *former* has generally lowered the pulse considerably, by throwing out a stronger perspiration, while the *latter* has given immediate local relief."

I can confirm the truth of this by experience, acquired long before I knew any thing of this native practice, and to which I was led by the unconquerable headache, heat, and throbbing of the temples, which nothing but venesection and the cold ablutions above-mentioned would completely allay.

Mr. Bruce describes a somewhat similar practice among the natives of Massuah, a very unhealthy island on the borders of Abyssinia.—

"Violent fevers, called the *Nedad,* make the principal figure in this fatal list, and generally terminate the third day in death. If the patient survive till the fifth day, he very often recovers by drinking water only, and throwing a great quantity upon him, even in his bed, where he is permitted to lie without attempting to make him dry, or change his bed, till another deluge adds to the first."—*Shaw's Abridgement, p.* 156. Cold water, cold cungee

water, or either of these acidulated with tamarinds, crystals of tartar, or nitrous acid, will be found the most grateful beverage. But it is necessary to remark that, till the irritability of the stomach is allayed, however urgent may be the thirst, the patient should be restrained from drink, especially in any large quantities. The cold ablution over the surface of the body will help to mitigate the thirst, till the stomach is tranquillized.

Leeches, succeeded by large and repeated blisters to the epigastric region, will be found a most valuable auxiliary to the above plan of treatment; and, where torpor in the lymphatic system of the abdomen is evinced by difficulty in affecting the mouth with mercury, the denuded surfaces should be dressed with mercurial ointment. With these means in use, I have generally awaited, with a kind of patient anxiety, the first symptoms of ptyalism; and, on the third morning, I could frequently perceive a certain odour on the breath, prelusive of salivation. When this last came on *free*, I pronounced my patient to be secure.

But if no symptoms of saturation appeared, I have *then*, or, indeed, if things wore an alarming aspect, I have, sooner than this, either increased the doses of calomel, exhibited them at shorter intervals, or conjoined with them mercurial frictions. For if relief could not be procured on the third, fourth, or fifth day, the chance of recovery became smaller and smaller in proportion. This relief sometimes preceded, sometimes succeeded; but was generally synchronous with the visible or sensible effects of mercury on the constitution, as evinced by the gums or breath. A mild and uniform diaphoresis, a refreshing sleep, and the appearance of natural stools, were the usual indications of this happy change; after which, as the ptyalism advanced, the train of morbid symptoms proportionally subsided, till at length the inability to eat, *in consequence of the soreness of the mouth*, became the principal complaint of the patient. Were I to go over the same ground again, I should be inclined to try a still more decisive system of depletion by bloodletting and purging, so as thereby to arrest the progress of the fever, even before the development of the mercurial action. But times and circumstances will so vary the features of this and other fevers, that different, and sometimes opposite modes of treatment must be adopted. That there may be cases wherein the use of wine, and even bark, is indispensable, I shall not attempt to deny. But the latter, in particular, I seldom had occasion to employ, except in cases of protracted convalescence; or to prevent relapses at the full and change of the moon, when such accidents are very liable to happen. I have only to remark further, that when this fever was combined with dysentery, an occurrence by no means unusual, the same treatment, with the exception of cold external applications, conducted equally to a happy termination.

It is necessary to observe, also, that the fevers, even of the same place, are not of the same type in all years; and, consequently, they require modifications of treatment. The above was the nature of the fever on the

banks of the Ganges thirty-five years ago, and the general mode of treatment described was found most beneficial. I have no doubt, however, that fevers in such places will often be effectually combated, by early depletion, especially purging, and then, when a remission takes place, by administering bark, particularly the quinine, so as to prevent the return of the paroxysms. Particular organs are to be guarded by local bloodletting and blistering, while the glandular secretions of the chylopoietic viscera are to be kept in order by appropriate doses of calomel or the quicksilver pill. It will be my object, as we proceed, to lay before the reader various kinds of fever—various views of the disease—and various modes of treatment. By these his ideas will be enlarged, his prejudices diminished, and his resources multiplied. (1841.)

As the object of this Essay is utility, and its design, to convey as much information on each subject, in as small space as possible; it becomes a duty to notice, in this place, the opinions and practice of Dr. Balfour, a medical authority in India, whose abilities and experience entitle him to respect. I shall endeavour to condense his doctrine and directions into as few pages as I can; referring to his *second* Treatise on Sol-lunar Influence (Edin. 1790), where these are more explicitly developed than in any of his other publications.

Dr. B. considers the mild and regular intermittent, as well as the more violent and continued Bengal fevers, together with dysentery, as so many grades of the "*putrid intestinal remitting fever*," all of which he pronounces to be *infectious*. He conceives that the contagion proceeds from putrefying or putrid bodies, and which, passing down with the saliva, corrupts the mucus of the stomach and intestines. That *this* putrid matter being absorbed, and carried into the circulation, gives rise to, and accounts for, the whole train of febrile symptoms. This is his theory, independent of "Sol-lunar Influence," which will be noticed hereafter.

With respect to the cure, he thinks that copious and continued purging would, in general, be sufficient to conduct mild cases to a successful issue; but, as we are liable to much deception, he advises that in these, as well as in the most violent fevers of Bengal, after *two days* purging with calomel and other cathartics, to begin, on the *third* morning, to "throw in" the bark in substance, so as to administer two ounces in the course of forty-eight hours. At the expiration of this period, the calomel is to be again repeated at night, and a laxative the next morning; immediately after the operation of which, the bark is to be again reiterated for two days, and in the same manner, as before. The purges and bark are thus to be alternated in exactly the above routine, till the disease is finally subdued. To give efficacy to this practice, a liberal use is to be made of opium, not only to keep the bark on the stomach, but to ease pain and procure rest.

With respect to those cases where there is *local affection*, Dr. B. only directs a superior degree of attention to be paid in guarding the body against

cold, with occasional blisters and diaphoretics. In some rare cases, where the local affection is violent, he admits of bleeding, both general and local; but all the other plans are to be pursued in the manner prescribed, without any regard to paroxysms, remissions, or exacerbations, whatever. Fifteen years afterwards, however, Dr. B. appears to have remodelled his plan of treatment, as the following passage evinces—

" Considering," says he, " that obstructions of the liver very frequently shew themselves, in the common fevers of this country, and may with great reason be suspected, in a certain degree, *in all*, we cannot hesitate to admit, as an essential and valuable principle, in the cure of fevers, *the introduction of mercury into the system, so as to affect the mouth in a moderate degree*, with the view of removing obstructions, or other morbid affections of the liver; of obtaining natural secretions, and of its thus contributing, *with the other means* that have been described, to a speedy and permanent cure."—*Preface to a collection of Treatises.*

I have thus given a fair view of two very different modes of treatment (and likewise their combination) in this dangerous disease. I have shewn my own preference for one of them, and I think substantial reasons for such; but I do not wish to blindly condemn the others, because I did not find them successful.

He who treads over the same ground which I have done, will, in every probability, have ample opportunities of putting them all to the trial, and then he may decide on their merits. But I would recommend him not to be too sanguine, nor condemn a practice from a few failures. It has not been my lot to find intertropical fevers so very tractable as some medical officers have, or say they have, found them. Those, indeed, who are most conversant with disease at the bed-side of sickness are well aware that no fixed rules or general plan of treatment are applicable at all times in fever, or in almost any other disease. But although the *means* must vary, the *indications* may be always the same.—Thus I conceive that, in those times and places where bark and stimulants proved more successful than depletion in tropical fever, there was equally as great a *derangement in the balance of the circulation and excitability* as where venesection and purgatives were carried to the greatest extent. The great art, indeed, is to early ascertain the prevailing diathesis, both of constitution and climate, and promptly apply the most appropriate methodus medendi.

I should be sorry to suspect, much less accuse, any of my professional brethren of *wilful* misrepresentation; but when *young* medical men are setting forth their cures by a *new* remedy, we may at least be allowed to enter that remarkably significant, though apparently paradoxical caveat of Hippocrates—EXPERIENTIA FALLAX.

MR. NEILL'S ACCOUNT OF A FEVER AT MADAGASCAR, SIMILAR TO THE BENGAL FEVER.

The foregoing observations will be illustrated and confirmed by the following authentic particulars. In the month of November, 1804, two parties of men, belonging to His Majesty's ship Tremendous, were employed on shore, at the island of Madagascar; one party, during the night, filling water, the other cutting wood during the day. Four of the night party were attacked with the endemic fever of the country, and three of them died. The whole of the day party escaped the fever, though exposed to an intense sun, in the laborious occupation of wood-cutting.

About two years after this, His Majesty's ship Sceptre, in the same place, and, upon a similar occasion, experienced a still greater disaster among her watering or night party, to whom the mortality was confined. Some interesting particulars respecting this fatal occurrence, I shall give in the words of the surgeon, Mr. Neill.

"The fever which attacked our watering parties at the Island of Madagascar, bears a striking resemblance to the endemic fever of the West;—like that too, it was not a contagious disease, of which we had the most cogent proofs, and corroborated what we witnessed at a former period. I believe that the exciting cause of this disease was confined to the site of the watering place, as no person was affected on the wooding party, though *constantly exposed during the day*. The deleterious effects of nocturnal exposure were particularly exemplified here, by the disease raging most violently among the marines, who were on shore at night for the protection of the casks, and to whom the mortality was confined. The fever made its appearance among some of the same party who did *not* pass the night on shore, but, in them, it was infinitely milder, though similar in type and general symptoms. The watering place was encompassed from the sea by an amphitheatre of hills; and in nearly the centre of this ran the rivulet from which we filled, situated in a *marshy plain*, surrounded with some trees of the palm kind, and a thicket of *jungle*. The wooding place, on the other hand, was a *dry sandy soil*, though standing equally low, and covered with brush-wood, jungle, &c. in the same manner as the other. As the more minute features of the disease are described in the journal, I shall only remark, that it exhibited something of the remittent type, inasmuch as the paroxysms were more conspicuous and violent on alternate days; and on the intermediate, the system seemed less oppressed and more tranquil, with a different cast of features in the countenance; but there never was any thing like an apyrexia. The general treatment adopted in these cases, and which the journal develops, consisted in bloodletting, purging, and exciting ptyalism; the pre-eminence of which practice, seve-

ral years' experience in this country has amply confirmed. My sentiments have been so often expressed on venesection, that I need not repeat them. With respect to purgatives, I have always observed the greatest relief to follow, when they took full effect. That they are beneficial in every stage of the disease, I infer from this;—that the pulse, from being depressed, weak, and void of energy, becomes open, energetic, and bounding to the surface, with a corresponding animation in the countenance, after copious catharsis, even in the last stage of debility.

"The next, and only remedy, where bloodletting and purging do not check the disease at once, in its infancy, is mercury to excite ptyalism. I say ptyalism, for *soreness of the mouth* will not secure the patient in this endemic. In many of the *fatal* terminations, the mouth was slightly affected; but we never were able to excite ptyalism. Wherever this last could be induced, a revolution as it were, in the whole train of morbid symptoms, instantly succeeded, and a healthy train supplied their place! This revolution was most strikingly evinced in the functions of the bowels, by the evacuations becoming, all at once, copious and feculent; a circumstance which, previous to ptyalism, no purgative, even of the most drastic nature, could effect."

Although the latter part of this document is foreign to the subject for which it was introduced, yet I trust it will be considered interesting. It is satisfactory to me, since it strongly corroborates what I have advanced lately on the treatment of the Bengal endemic, both in respect to bleeding and ptyalism; the former being rather *heterodox* in India. I have only to remark, in reference to the striking coincidence of our practical views, that the above document was never penned for my inspection, or that of the public. The sensible and well-informed author of it (Mr. Neill) is alive, and can contradict any misrepresentation of his sentiments.

I shall here observe, once for all, that the foregoing remark will equally apply to all other documents and narratives introduced into this Essay, in addition to my own personal observations. They are strictly authentic; being the spontaneous records of facts, commemorated without preconceived theory or preconcerted design. I need not say how much their value is enhanced by this consideration.

In the account of the Batavian endemic, some other striking instances, corroborative of the opinions here advanced, will be related. In the mean time, the above examples will be sufficient to justify the rules I have laid down, and put future navigators on their guard, where disease and danger lurk in concealment.

J. J.

IX.—Remarks on the Remittent Fever of Bengal.

A memoir like the present is not consistent with any lengthened detail of the nature, causes and treatment of disease; but there are certain prominent features in tropical fever and dysentery which, with reference to the great importance of the subject, require to be touched upon.

In noticing the more ordinary fevers of Calcutta, whether endemic or epidemic, the first observations that force themselves are, their great differences as to intensity, in the present, as compared to former times; and secondly, the causes of this difference.

The earliest account we have of the state of public health, and of the period of greatest mortality, in Calcutta, is that already quoted from Captain Hamilton, wherein he mentions 460 burials out of 1200 British inhabitants, from August till the ensuing January: this was between the years 1688-1723.

In Calcutta we have no longer such terrible epidemics as that of 1770, with its *cold stage of twelve hours*, which carried off, according to Clark, 80,000 natives and 1,500 Europeans. These pestilences seem to have in a great measure gone from us; and we happily find that here, as in the Western hemisphere, the malignant fevers of former days, if they have not disappeared, are greatly mitigated. Even in Jamaica, although severe fevers sometimes recur, they do not, as formerly, destroy " to the amount of the whole number of its white inhabitants once in five years."

Stavorinus, speaking of the " sort of sickness or fever," which prevailed amongst the inhabitants of Calcutta during his visits (1766-71) says, that it " generally sweeps away those who are attacked by it in the space of three days."

Of Major Kilpatrick's force of 240 men stationed at Fultah, " not thirty of the whole detachment were left alive between August and December, 1756, by one of these epidemics." The same authority (Ives) adds, that " the number of men buried in Bengal amounted to more than half of all who died in the several hospitals in India during the whole term of Admiral Watson's command, a period of three years and one month."

Dr. Bogue, who also served in Watson's fleet, says, that, " out of three ships of the line and a twenty gun ship, and those not fully manned, we lost in six months upwards of two hundred men, most of whom died of these fevers;"—so much worse was the climate of Calcutta in those times than that of any other port in our Eastern possessions.

Dr. John Clark, who visited Calcutta between the years 1768 and 1771, states, that the " fever and flux" were very fatal in the former year. Of the first named disease he says, that " it frequently carries off the patients in twelve hours." * * " During the sickly season at Bengal the uncertainty

of life is so great, that it frequently happens that one may leave a friend at night in perfect health who shall not survive the following day. There have been several melancholy instances of persons who have returned home in a state of perfect health from performing the last duties to a deceased friend, and have next day been numbered with the dead."

From the Medical Journals of the Surgeons of ships trading to the various ports in the East Indies, Dr. Clark obtained the following general result; namely, that out of 189 cases of fever, "105 recovered, and 84 died:" again—"out of 876, the complement of men belonging to eight ships, 78 died at Bengal, and 55 at sea; or nearly *one* in *six*. Both the fever and flux, if obstinate, have an equal tendency to terminate in abdominal obstructions, particularly in fatal swellings and suppurations of the liver."

In the year 1784, Mr. Magennis states that, out of the crew of his ship, the Valentine, and six others stationed off Kedgeree, there died of fever and dysentery, 170 men, the usual period of their stay in the Hooghly river being from August to January. Mr. Curtis of Madras writes, that in 1781, out of two companies of the 98th and 100th regiments, embarked in England for India, there died during a "suffering and tedious passage of exactly eleven months, 75 men—viz. forty from fever; eighteen from dysenteric flux; and the remainder from scurvy and cachexy." It would appear that these unfortunate companies had "some occasional fillings up from the other ships as the numbers decreased;" but, even making the necessary allowance for this circumstance, the loss of life is horrible to think of; especially when we reflect that each ship in a large fleet shared a like mortality.

Along with salt diet, there was here crowding and want of ventilation—the most unfavourable combination of circumstances, whether in health or sickness.

That a scorbutic taint* was universal in those times may, I believe, be admitted; and this circumstance will account for the general term "putrid," as applied by the older writers to the endemic fevers and dysenteries: this unfavourable complication will likewise go far to account for the mortality.

Of just or useful comparison therefore, between the results of former and recent hospital management, there can be little or none; but this much I think, may be allowed in favor of the modern plan; that in consequence of our greater freedom of depletory means, by bloodletting especially, and rigorous abstinence, we have fewer of the sequelæ of fevers, such as en-

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* In the open well ventilated Naval Hospital at Madras, containing between 4 and 500 men, Mr. Curtis states "the great bulk of the cases to have been *ulcers*:" indeed, he constantly refers to the scorbutic taint as prevalent amongst both soldiers and seamen.

larged liver and spleen, than existed formerly; for, in the Military hospital at Madras, in 1782, we find by a monthly report of Mr. Paisley's that there were then in the house :—

" Venereals	50
Quotidian remittents	2
Simple bilious fevers	30
Bilious fevers, with visceral obstructions	15
Simple fluxes	20
Liver fluxes, and fluxes from visceral obstructions	98
Chronic visceral obstructions from impaired habits	69
Total	284"

Thus it appears, that out of 284 cases in hospital, 182 laboured under some form of " visceral obstruction;" that is, organic disease of the liver or spleen, or both, in a more or less acute form; in either case, rendering death more or less remote, a necessary result.

It is here then, and not in the comparison only of actual mortality within the wards, that our hospital management contrasts favorably with that of the olden times.

The causes of the present comparative superiority in public health must be of the highest interest and importance, especially to communities living within the tropics; and, with all the just confidence in modern medicine, guided by the lights of an improved physiology and those of pathology, I cannot yet agree with those who would ascribe the *whole* of the difference here spoken of, to superior modes of medical management, great as these confessedly are. It is not through the advantages of modern improvement in the treatment of mere disease, as contrasted with the more ancient modes, that public health has been so much amended, as through the great measures of *prevention* of *disease*, consequent on the progress of the public mind, and of Governments, *in general knowledge*, leading directly to improved habits of life in communities, improved localities, institutions of police, &c.: it is to these reciprocal actions of the social state and of political events upon each other, and upon medical science, that the advancement of public health is most indebted, and that it will continue to be so, although the circumstances are not sufficiently weighed by some of us, when, in our hurry to praise ourselves, we forget what is due to our predecessors, and that these last had frequently to treat a form of disease which we have never seen, and with whose fatal severity we are, consequently, unacquainted.

This much I think due to the older practitioners of India, many of whom were evidently men of talent and correct observation.* Their position also, was one of great individual danger and difficulty.

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* That acute observer, the Rev. Dr. Tennant, speaks of the treatment of the fevers

I am satisfied we are never so wrong—perhaps we are seldom so ignorant of the truth and of circumstances—as when we indiscriminately censure those who have gone before us, and who, as in the case here spoken of, had to treat a fever with the very type and aspect of which we are at present unacquainted. It should not be said of us that we are only able to see the defects of the older writers by the lights which they have afforded us.

Dr. Southwood Smith has the following observation on this head. "It is remarkable how entirely the most distinguished physicians of all ages, who have treated of this subject," (fever) "coincide in the feeling, that with regard to this important class of disease, it is impossible, in the short life allotted to the most aged, to do any thing more than add a little knowledge to the common stock." If this be true—and who that knows any thing of medicine can doubt it—we need be in no haste to praise ourselves, and we should be slow to censure others; because, according to Sir John Pringle, as natural knowledge is daily improving, those who write last on subjects connected with it are most likely to be in the right; and, he might have added, without any other merit on their parts than happening to live in later times—or, in the words of a celebrated reviewer, they were behind us. It could not be otherwise.

It was here, as in the diseases of the peninsular army so admirably described by Sir James Macgrigor; "not only had fever very different forms in different seasons, and in different quarters of the same seasons, but they required very different, nay opposite kinds of practices, the knowledge of this strongly impresses on us the necessity of becoming acquainted with every attending circumstance before we venture to censure any particular practice."

If we would desire a further lesson of professional moderation, let us take it from the acute observer Hennen, who, in speaking of the severer remittent fevers of the Mediterranean, makes the following remarkable observation, and which nothing but the precise results derivable from medical statistics can invalidate.

"I have not had access to the returns of the French and Russian army, but I have been made acquainted with the general result, which speaks strongly in favor of those medical philosophers, who assume that on an average of years, mortality by fever is nearly the same, whatever the mode of treatment adopted may be. For I have every reason to suppose, that among the French troops, where the 'medicine expectante,' was generally

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of his time, 1796, as being "simple and decisive, and more efficacious than that of any set of diseases equally malignant in Britain." Whether our predecessors boasted of the great success here spoken of, he does not say; but this much is certain, namely, that the public was satisfied with the results of their treatment.

the order of the day, there occurred, upon the whole, no greater proportion of deaths than among the English, who met the fevers of the country with mercury and the lancet in all the activity, and all the orthodoxy of the schools. And among the Russians, whose practice was as rude and barbarous, and their apathy as to the event, as impenetrable as that of their Turkish neighbours, the results were similar." Now, if these had been the observations of an ignorant or desponding physician, I should consider them unworthy of notice; but who is there that recollects the talent, energy, and moral courage, together with the experience of Dr. Hennen, that will not read in these remarks a lesson of moderation. It was not that Dr. Hennen despised the means, or that he considered it indifferent which was chosen; for in his own experience he well knew how to practise with energy and effect: it was that in all his writings he viewed boasting as something worse than bad taste. Had Mr. Wade, in his *four hundred* cases, shewn more of this candid spirit, and more also of Dr. Hennen's other qualities, they would have been longer remembered, and his wonderful cures, as well as those pretended to by others, might have been some example to us.

So far as I can learn, the fevers of this place have for a length of time been treated according to the symptoms, and not by any exclusive plan: bleeding has been had recourse to, to moderate the force and frequency of arterial action, and to relieve complications; free purgation, by means of mercurials conjoined with brisk cathartics, to remove accumulations or vitiated secretions, and to aid in correcting the latter; mercury with sudorifics, to equalize the circulation, and to act on all the secretions and excretions; bark, or quinine, during the remissions, to arrest the coming paroxysm—cold affusion in the ardent continued fevers of the hot season; these have been long in use.

If tropical fever and dysentery were always simple morbid actions, or mere inflammatory states of the system or of particular organs, no doubt, as recommended by some, bleeding and purging might in general prove adequate to the cure; but unfortunately, in both cases, we seldom find this unmixed condition to hold in actual practice in Bengal, where, besides the morbid condition of the entire system, and the violent disturbance of the nervous and vascular functions in particular, we have, in our fevers, continually to combat dangerous abdominal complications, with the addition, in those of the hot season, of the cerebro-spinal—all demanding a more or less complex and careful treatment—a speedy unlocking of all the secretions and excretions, which the most ample experience proves that bleeding and purging *alone* will not effect:—Tropical fever, dysentery, and hepatitis, are produced by the action of specific causes, and such diseases are nowhere remedied by bloodletting and purging merely, as in the instance of inflammation. Yet bleeding, here as in dysentery, is the standard remedy, subject to age, constitution and length of residence in India. It precedes all

other management in the order of time, and in point of importance. I believe this to be the general view of it taken by the practitioners of this city; and it is but common justice to say that the value of this most powerful of all means was first emphatically urged on the Indian Surgeon by Dr. James Johnson: it is to him we owe that bloodletting has become a systematic part of our treatment. Of the several valuable authors besides, who have since followed him, and helped to fix the professional attention, I need say nothing.

Subject only to the limitations already stated, bleeding,—early and copious bleeding, *and practised at the very onset of the stage of re-action*—is very generally necessary in the severer forms of Bengal remittent fever; then, full doses of calomel with sudorifics, short of producing salivation, with saline purgatives in the intervals. If the disease does not now yield, but on the contrary, if the secretions become watery in their nature, or suppressed, and the paroxysms recur at shorter intervals, or with increased severity, leaving but imperfect remissions—then there is imminent danger; and inflammation or acute congestion in some important abdominal or other organ, may be more than suspected. For this, in addition to topical bleeding and cold to the head, when the seat of disease, mercury in small repeated doses, with antimonials, must be given so as mildly to affect the system: it is the only known means of saving the patient by anticipating the destruction of some organ essential to life: it here becomes, in the apt words of Dr. Robert Jackson, a remedy of necessity.

Where the remissions, on the other hand, are well marked, quinine should be given in full doses, without waiting for every thing. Some practitioners recommend that before this drug is used, we obtain previously a clean tongue, natural secretions, and the absence of all heat of skin or local affection. I believe this to be a very dangerous practice: if we are to wait for every thing, we shall often wait too long, or till it is too late. I have always administered quinine in the more favorable cases now stated, in disregard of certain local abdominal complications (those of the head should in general exclude it), believing that if I arrest the paroxysm, I do greatly more towards the cure at large, than quinine can possibly do of harm to the local affection—the treatment of which by local depletion and counter-irritants is not interfered with by this means: again, all tenderness on pressure or local pain, does not, in the case here stated, necessarily constitute inflammation. In administering quinine I frequently combine it with sudorifics, and I think with advantage.

In the more favorable cases last spoken of, it rarely happens that topical bleeding, purgatives, and mild mercurials, &c.—with quinine during the remissions, fail in conducting the patient to safety, the general measures already stated having been premised. I have also seldom had occasion to urge mercury to the degree of salivation, during the whole period of my service in India.

Almost all our complications in the fevers of Bengal are abdominal, whether these be of an inflammatory nature, congestive, or of mere irritation; and this would seem to be the cause of the prostration, with tendency to collapse, so common especially during the rainy season with us; for even within a few hours, as contrasted with similar affections of the head and chest, there exists here an oppression of the vital functions, alarming to the stranger physician.

The prostration produced by a violent blow on the abdomen more nearly resembles the febrile collapse than any other morbid condition with which I am acquainted; and it is probable that both depend on the disturbed function of the organic system of nerves—the powerful though silent source of many symptoms known to us only by their effects.

This tendency to sinking is the reason why our measures of cure must be so guarded as to the time of using them;—for there is no country in the fevers of which more regard must be paid to the stage of disease for applying remedies, especially bloodletting, than in those of Bengal: *what was a saving means at the commencement of the paroxysm is as surely destructive at the end of it.* It is here too that camphor forms so valuable an adjunct to calomel. On the subject of bloodletting, Dr. Robert Jackson's earliest works even, abound in valuable injunctions, and such as ought to be present to the recollection of every man who undertakes the onerous and responsible duty of treating tropical fever. After some admirable rules as to the "just point of time," he concludes that "the same remedy, after the delay of a few hours, not only ceases to be useful, but the application of it even sometimes becomes unsafe:"—further, he adds with truth that, "it requires much discernment in many cases to discover the cause, a very correct judgment to measure the means, and even no small degree of knowledge to be able to ascertain that the end is attained."

On the subject of active treatment, I must once more bear witness to the general efficacy of bloodletting when practised at the proper time; and I cannot more forcibly do so than by stating that, to the best of my recollection and experience, I do not remember a single case in twenty years wherein judicious depletion did not appear to afford relief, even where it could not cure.

That our fevers alter their type;—nay, that instances, both endemic and epidemic occur, in which bloodletting is injurious or unnecessary, the pages of this report sufficiently attest; and death even from its ill-timed use, has more than once come under the writer's observation; yet, the fact remains untouched, that bloodletting, practised at the proper time, and apportioned to circumstances of constitution, age, sex, season and length of residence in India, forms the principal means of cure in our endemic fevers, and of preventing those organic lesions which otherwise so frequently follow them. In fever then above all diseases, we must ever admit, with Trophilus,

that, " he who is able to distinguish what can be done, and what cannot be done," is the true physician ;—but how great and difficult the task !

I cannot conclude these cursory remarks without adverting to the importance of the management of convalescence from fever—not the least serious of the duties imposed on the Indian physician. In all cases of recovery from fever, but especially in those wherein the complications have been severe, or where important organs have been affected in the course of the fever, or as a sequel to it, it is impossible to be too careful in the diet, and in attention to the nature and activity of the secretions ; —and this vigilance must not be relaxed until perfect health is re-established. How often do we see patients who have been well enough treated during the acute disease, but on whom the neglect of this rule of practice entails enlargement of the liver or spleen, or other visceral engorgements, requiring a protracted sea voyage, or even a return to Europe at great inconvenience. This is a subject that should always be present to the mind of those who have the management of military hospitals, wherein the perfect re-establishment of the soldier's health, before his return to barracks, should be a maxim never to be swerved from.

This is not the place for reviewing medical books, or laying down general rules of practice ; but it cannot be too much or too often impressed on the Indian surgeon, that it is on his careful attention to the phenomena of fever that nine-tenths of his usefulness depend. I have here attempted an outline of the treatment of the endemic fever of Calcutta, and of Bengal generally : it will be found to correspond in principle with that of the endemic fevers—the bilious remittents of the world—whether east or west : they are all fevers of locality, and do not by any means differ so much as medical writers of partial views and partial experience would have us believe :—their supposed differences, or nosological divisions, are more frequently the work of man than of nature : they may, and do differ in degree of intensity ; but their essential phenomena, and the organs affected in their progress, so as to endanger, or ultimately destroy life, are the same ; and so likewise are the essential parts of their treatment.

It may now prove useful to take a glance at the prominent parts of the treatment of tropical fever by the following authors, in their order of dates :—

1629. Bontius :—purging—bleeding, general and topical, repeated as occasion requires—opiates—extract of saffron, &c.

1751. Cleghorn :—bleeding, repeated according to occasion—cathartics—bark.

1757. Dr. Bogue, formerly of Bengal :—bleeding—emetics—purgatives—mercury—bark—camphor in the cold stage.

1757. Huxham :—bleeding—purgatives—diluents.

1760. Huck :—bloodletting, repeated according to occasion—ipeca-

cuanha and tartar emetic, so as to vomit and purge—bark during the remission.

1768. Pringle :—bleeding repeated according to occasion—active purges —antimonials—bark occasionally.

1790. Balfour :—vomits—calomel and purgatives, frequently repeated —bark and opium.

1795. Chisholm :—calomel and opium—to salivation.

1797. Clark :—mercurial purgatives—bark—anodynes.

1799. Blane :—bleeding—vomiting and purging—sudorifics—bark—anodynes.

1803. Dr. Robert Jackson :—copious bleeding, and practised always in the recumbent posture—emetics and purgatives—cold bath—mercury only as a " remedy of necessity "—change of air.

1807. Curtis :—evacuants and diluents in the first stage—calomel, ipecacuanha and purgatives, in protracted cases.

1808. Lind :—cautious and limited bleeding—vomiting—purging—antimonials—bark.

1810. W. Fergusson, Inspector General :—early and copious bleeding —mercury to affect the system—sudorifics—purgatives.

1811. Bancroft:—bleeding—cold affusion—calomel—purgatives—bark.

1813. Dr. James Johnson :—bleeding, general and local—calomel with purgatives—mercurial treatment, according to severity of disease—diaphoretics—change of air.

1816. Burnet :—bleeding, general and topical, according to occasion—purgatives.

1818. Ballingal :—bloodletting, general and local—purgatives—cold affusion—moderate use of mercury—occasional emetics, and the use of bark.

1819. Dickenson :—vomits—bleeding—active purging—cold ablution —diluents.

1827. Geddes :—bloodletting—mercurial and other purgatives—antimonials—diluents—opiates before the paroxysms—quinine.

1828. Annesley :—bloodletting, general and local—emetics—full doses of calomel—purgatives—diaphoretics—cold affusion and cold applications to the head—enemas—bark during the remission.

1832. Mr. Twining :—bleeding, general and local—two or three full doses of calomel, followed by active purgatives—mercury so as to affect the system " in some cases "—quinine during the remissions.

1833. Dr. Joseph Brown, Cyclopædia of Practical Medicine :—bleeding, general and local, aided by the warm bath—mercurial purgatives—cold affusion—cold to the head—acidulated cold drinks. In the advanced stage, opium—change of air.

1835. Dr. Copland, Dictionary Practical Medicine :—an emetic—bloodletting, general and local—" full doses of calomel followed by purgatives "

—evaporating lotions to the head—cooling diaphoretics—enemas—quinine, during the remission.

For the following Table, exhibiting the comparative frequency and the intensity, as shewn by the relative mortality, of Remittent Fever, throughout the wide extent of climate occupied by British soldiers, I am indebted to Major Tulloch :—

STATIONS.	Period of Observation.	Aggregate. Strength.	Remittent Fever.		
			Attacked.	Died.	Proportion of deaths to admissions.
Windward and Leeward Command	20 years ..	86661	17799	1966	1 in 9
Jamaica	20 ,,	51567	38393	5114	1 in 8
Gibraltar	19 ,,	60269	YF. 314	28	1 in 11
			1522	423	1 in 3 2/3
Malta	20 ,,	40826	384	16	1 in 24
Ionian Islands	20 ,,	70293	6934	623	1 in 11
Bermudas	20 ,,	11721	YF. 19	6	1 in 3
			277	101	1 in 2 3/4
Nova Scotia and New Brunswick	20 ,,	46442	15	..	1 in 15
Canada	20 ,,	64280	294	18	1 in 16
Western Africa	18 ,,	1843	1601	739	1 in 2
Cape of Good Hope	19 ,,	22714	15	1	1 in 15
St. Helena	9 ,,	8973	25	1	1 in 25
Mauritius	19 ,,	30515	6	1	1 in 6
Ceylon	20 ,,	42978	4643	868	1 in 5 1/2
Tenasserim Provinces	10 ,,	6818	594	22	1 in 27
Madras	5 ,,	31627	1139	54	1 in 21
Bengal	5 ,,	38136	1311	89	1 in 14 3/4
Bombay	5 ,,	17612	2854	114	1 in 25

J. R. M.

X.—On Marsh Poison. By Dr. William Ferguson.

[Analysis.]

——— Quod sol atque imbres de derant quod terra creârat,
Sponte Suâ. Lucret.

It is nearly correct that one half of life is spent in *unlearning* what was taught us during the other half. This melancholy truth is peculiarly applicable to many parts of medical science, where opinions, apparently based on facts, are revolutionized with astonishing, and sometimes whimsical rapidity. We need not go farther than the subject of fever, as far as regards its nature, cause, and treatment, to illustrate the above assertion. The warfare between the contagionists and anti-contagionists is active on both sides of the Atlantic; but the former class have most power over the minds of the community at large, whose fears and prejudices preponderate, with overwhelming force, on the side of contagion.

One point of the etiology of fever, however, seems to have long rested on a solid base—namely, the agency of vegeto-animal, or as it is usually termed, marsh miasma, on the human constitution. All conjectures, indeed, respecting the essence or nature of this invisible agent, have subsided; for we now begin to feel a conviction, that the essences of things are beyond our ken. But a great many of the laws which govern, and the consequences produced by, marsh effluvium, were supposed to be understood. A very general (but not universal, as Dr. Ferguson supposes) opinion prevailed, and still prevails, that the agent in question owes its deleterious influence to "vegetable or aqueous putrefaction"—an opinion which it is Dr. Ferguson's object to prove *unfounded*—"because, as will presently be seen, the marsh must cease to be a marsh, in the common acceptation of the word, and the sensible putrefaction of water and vegetables must alike be impossible, before its surface can become deleterious." It will also be seen, he observes, that a healthy condition of soil, in pestiferous regions, "is infallibly regained by the restoration of the marshy surface in its utmost vigour of vegetable growth and decay." It is very difficult to reconcile this assertion with what hundreds, now living, saw at Walcheren in 1809 (not 1810, as Dr. F. states), where the greatest possible degree of sickness prevailed in those parts, especially round Flushing, where the ground was *half inundated*, and consequently, where growth and decay were going forward with vigour. We do not mean to argue, indeed, that dry soils and seasons must consequently be healthy ones. We know how often it is otherwise; but still we believe that, speaking generally, that soil is in the best condition for giving

out miasmata, which is just in a state neither dry nor overflowed, but exposing a slimy vegetable, muddy or miry surface to the action of an autumnal sun. Speaking of Rosendaal, Dr. Ferguson observes, that it was covered with stunted heath plants, and that, "on digging, it was universally found to be percolated with water to within a few inches of the surface, which, so far from being at all putrid, was perfectly potable in all the wells of the camp." Now we do not think there is any incongruity in supposing the water to be good when below the surface, but capable, in its ascent through the heath plants, of carrying or causing those effluvia which experience shows to be so deleterious to life. We know nothing of the taste, smell, or sensible properties (if at all sensible) of marsh miasma, and, therefore, we are not authorised to say that water is divested of them because it is clear or potable. Indeed, we have strong reason to believe that water, in the form of rain, dews, or even collected in wells and cisterns, in unhealthy climes, is often impregnated with what we term marsh effluvium. Still, however, a cloud of mystery hangs over the production and extrication of this febrific agent; for in the same place, and apparently in similar years as to temperature, rains, &c. we shall find the inhabitants and sojourners at one time healthy, and at another sickly.

Dr. Nicholl, a physician of great intelligence and discernment, inspector of hospitals on the coast of Africa, has portrayed the capricious and uncertain generation of fevers there in very striking colours, but we have not room to introduce his observations in this place.

Dr. Ferguson proceeds to state several interesting particulars relative to the medical topography of those countries through which he has campaigned.

In the month of June, 1809, our army marched through a singularly dry, rocky, and elevated country, on the confines of Portugal, the weather having been previously so hot for several weeks, as to dry up the mountain streams. "In some of the hilly ravines, that had lately been water-courses, several of the regiments took up their bivouac, for the sake of being near the stagnant pools of water that were still left among the rocks." Several men were seized with remittent fevers before they could leave the bivouac next morning, and that type of fever continued to affect the portion of troops exclusively which had so bivouacked for a considerable time. This incident is adduced by our author to prove that the "humid decay of vegetables" is not essential to the production of pestiferous miasmata. But we confess that we see no proof of the non-existence of decaying vegetable and animal substances, when we are bivouacked in the bed of "a half-dried ravine" and near "stagnant pools of water." If we examine narrowly into the state of things, we shall scarcely find a spot of this earth's surface that is not covered or embued with both vegetable and animal remains, in a state of decomposition; and ready to afford pabulum for the sun's rays, with or without humidity, to extricate the injurious principle in question. Nor do

we see any thing in the following passage to contravene, but much to confirm, what we have here advanced.

"The army advanced to Talavera, through a very dry country, and, in the hottest weather, fought that celebrated battle, which was followed by a retreat into the plains of Estremadura, along the course of the Guadiana river, at a time when the country was so arid and dry, for want of rain, that the Guadiana itself, and all the smaller streams, had, in fact, *ceased to be streams,* and were no more than *lines* of *detached pools* in the courses that had formerly been rivers; and there they suffered from remittent fevers of such destructive malignity, that the enemy, and all Europe, believed that the British host was extirpated; and the superstitious natives, though sickly themselves, unable to account for disease of such uncommon type amongst the strangers, declared they had all been poisoned by eating the mushrooms (a species of food they hold in abhorrence) which sprung up after the first autumnal rains, about the time the epidemic had attained its height. The aggravated cases of the disease differed little or nothing from the worst yellow fevers of the West Indies; and in all the subsequent campaigns of the Peninsula, the same results uniformly followed, whenever, during the hot season, any portion of the army was obliged to occupy the arid encampments of the level country, which, at all other times, were healthy, or, at least unproductive of endemic fever." p. 5.

Those who have travelled through, or resided any time in Sicily, are familiar with circumstances of the above description, of which Irvine and Boyle have related many particulars. From the former of these authors we shall make an extract illustrative of the sentiments here advanced.

"Sicily is penetrated in several directions by ridges of primitive hills of considerable height: between these are numerous water-courses, which are dry in Summer, and occasionally filled by torrents in Winter. They are designated by the Sicilians, FIUMARE, and are used as roads in the dry season. Many of them are extremely unhealthy in the latter part of Summer, and in Autumn, and infested by what the natives term MALARIA. The state of this *malaria* varies much according to the state of the season. A very wet season will *overwhelm,* as it were, the sources of this febrific, while a very dry one will so parch up the surface of the earth, as to produce a similar effect. At LENTINI, however, around which the country is marshy, with a considerable lake in the vicinity, the ground is *partly* freed from water in hot weather, but is never so dry as to prevent the formation of miasmata. Here there is a malaria every year. In many of the *fiumare* the stream disappears in the gravel, and percolates under the surface to the ocean. Thus, at the bottom of the large *fiumara* which bounds Messina on the northern side, fresh water will be found at a foot depth, close to the sea. It is in these kinds of fiumares that a malaria prevails, according to the opinion of the natives, throughout the year: and this probably accounts for the extrication of miasmata in many parts of the West Indies as well as

Europe, where there are apparently no materials for their production. Thus some places in Sicily, though on very high ground, are sickly; as Ibesso or Gesso, about eight miles from Messina, situated upon some *secondary* mountains lying on the side of the primitive ridge which runs northward towards the Faro, which has always been found an unhealthy quarter for English troops. It stands very high; but still there is higher ground at some miles distance. Water is scarce here, and there is nothing like a marsh.—At this station, however, sickness seldom occurs, 'unless after rains falling while the ground is yet hot, that is, during the heat of Summer, or early in Autumn, when all circumstances combine for the production of miasmata.' "—*Irvine*, p. 6.

The medical topography of Lisbon and its vicinity is interesting. The breadth of the Tagus, at this capital, is not more than two miles—but it is the boundary betwixt sickness and salubrity. The villages and hamlets scattered on the south or Alentejo side of the river—a soil dry superficially, being perfectly flat and sandy—are the most pestiferous abodes. The sickly tract is not confined to the immediate borders of the Tagus. Salvatera, a large village, about a mile inland, though reputed healthy till the beginning of Autumn, is then deserted by every one who has the means of escape.

" In their superstitious fear, the inhabitants declare that even the horses and other animals would be seized with fever if left behind, and, therefore, they always remove the royal stud. The country around is perfectly open, though very low, and flooded with water during the whole of the rainy season; but, at the time of the periodical sickness, it is always most distressingly dry; and exactly in proportion to the previous drought, and consequent dryness of soil, is the *quantum* of sickness. I have visited it upon these occasions, and found it the most parched spot I ever saw; the houses of the miserable people that were left behind being literally buried in loose dry sand, that obstructed the doors and windows." 6.

Dr. Ferguson adduces another example of this kind near Ciudad Rodrigo, situated on a rocky bank of the river Agueda, a remarkably clear stream. The approach to this town is through " a bare, open, hollow country, that has been likened to the dried-up bed of an extensive lake. Upon more than one occasion, when this low land, *after having been flooded in the rainy season,* had become as dry as a brick-ground, with the vegetation utterly burnt up, there arose fevers to our troops, which, for malignity of type, could only be matched by those before-mentioned on the Guadiana."

We do not think that the above fact disproves the existence of decayed vegetable remains acted on by humidity. We see that the malaria is always *after* the rainy season, and when the surface of the soil is acted on by a powerful sun. We all know, too, that, in the hottest season, there is the most copious precipitation of dew at night, followed by its exhalation in the day. Who is prepared to say that these exhalations of humidity carry with them no noxious miasmata from decayed vegetable and

animal remains? There is, we think, much more in favour of this opinion than against it.

During the years 1815-16 and 17, our author was employed in making a medico-topographical survey of the West India Islands—a service that afforded him diversified opportunities of improving the observations he had elsewhere made on the subject under discussion. Dr. Ferguson very truly remarks that—

"It might *there* be seen, that the same rains which made a deep marshy country perfectly healthy, by deluging a dry well-cleared one, where there was any considerable depth of soil, speedily converted it, under the drying process of a vertical sun, into a hot-bed of pestiferous miasmata." 8.

It has always been remarked that a morass or fen, when completely overflowed, becomes harmless, as exemplified in the case of the unwholesome town of Castries, at the bottom of the carenage, in the island of St. Lucia —a town embosomed in a deep mangrove fen. It became perfectly healthy under the periodical rains; while the garrison on the hill of Morne Fortuné, immediately above it, began to be affected with remittent fevers. The following passage is surely against Dr. Ferguson's doctrine.

"The top and shoulders of the hill had been cleared of wood, and, during a continuance of dry weather, the garrison had no source of disease within itself, but this was amply, though but temporarily supplied, as soon as the rains had saturated the soil on which it stood." 9.

Is not this a proof that it is the exhalation of moisture, saturated with some noxious principle—and what can afford this principle but vegeto-animal decomposition—which is the cause of disease? Dr. Ferguson observes immediately afterwards—"that an uncommonly rainy season at Barbadoes seldom failed in that perfectly dry and well-cleared country, to induce, for a time, general sickness;" while Trinidad, the centre of which may be called "a sea of swamp," was always rendered more sickly by a cessation of the preserving rains. What can be more corroborative of the principle we maintain than the foregoing facts—and still more so the following:—

"General dryness of soil, however, is far from being the ordinary characteristic of our West India colonies. The swamp is too often exposed to the continued operation of a tropical sun, and its approach to dryness is the harbinger of disease and death to the inhabitants in its vicinity." 9.

Dr. Ferguson observes, what we have occasionally seen, that an offensive odour is by no means a certain indication of uniform insalubrity in a marsh. Thus the town of Point au Petre, in Guadaloupe, is situated among the most putrid marshes in the world, the stench of which is never absent from the streets—yet the place was far from being *uniformly* unhealthy. Strangers, though much annoyed by the smell, often resorted to the place with impunity.

"But at Fort Fleur d'Epée, the farthest out-post, at the extremity of the

marshes, where they approach to the state of Terra Firma, where little or no water is to be seen on the surface, and no smell exists, there cannot be supposed a more deadly quarter, and all white troops considered their being sent there, as equivalent to a sentence of death." 10.

It has long been known that the *lower* apartments of a building, situated in a place capable of giving out these deleterious miasmata, were always more unhealthy than the *higher*. This will not hold good with respect to elevated grounds in the *vicinity* of a marsh. These elevations would appear to attract the deleterious principles floating in the atmosphere in the manner they attract the clouds and rains. Thus Port d'Espagne, Trinidad, is situated close to the great eastern marsh; and although not a healthy town, it is not uninhabitable. On the right are some heights which rise out of one extremity of the marsh. These are composed of pure limestone, and have proved a residence deadly and destructive in the highest degree. "No place, however elevated, or sunk, or walled in, or sheltered, gives security against the exhalations from below." It has been distinctly ascertained, indeed, that the degree of insalubrity is in proportion to the degree of elevation. The summit, 400 feet above the level of the marsh, is so deadly a spot, that not even a Creole Mulatto Spaniard could sleep in it with impunity, for a single night, after a course of dry weather.

Another curious example is given at the beautiful post of Prince Rupert's, Dominica, which is a peninsula, comprehending two hills of romantic form, joined to the main land by a flat marshy isthmus to windward. The two hills jut out on the same line into the sea, the inner hill being a pyramid 400 feet high above and across the marsh—the outer hill forming a bluff promontory overhanging the sea. Between these is a narrow clean valley, which was pitched on for a garrison establishment, but found unhealthy. A barrack was then constructed on a natural recess or platform on the inner hill, 300 feet above the marsh; "but it proved to be pestiferous beyond belief—in fact, no white man could live there." A quarter was built on the *outer* hill, on nearly the same line of elevation, and exactly 500 yards farther from the swamp. This was found perfectly healthy.

This curious fact proves, we think, incontestibly, that the swamp was the source of deleterious effluvium, and that the localities, terrestrial and atmospheric, determined the current of this noxious exhalation on the position taken up on the inner hill.

The following piece of medical topography will be read with much interest.

"In the Island of Antigua, the same results were confirmed in a very striking manner. The Autumn of 1816 became very sickly, and yellow fever broke out in all its low marshy quarters, while the milder remittent pervaded the island generally. The British garrison of English Harbour soon felt the influence of that most unwholesome place. They were dis-

tributed on a range of fortified hills that surround the dock-yard. The principal of these, Monks Hill, at the bottom of the bay, rises perpendicular above the marshes to the height of 600 feet. The other garrisoned hill, which goes by the name of the Ridge, is about 100 feet lower, but instead of rising perpendicularly, it slopes backwards from the swamps of English Harbour. It was the duty of the white troops, in both these forts, to take the guards and duties of the dock-yard amongst the marshes below, and so pestiferous was their atmosphere, that it often occurred to a well-seasoned soldier mounting the night-guard in perfect health, to be seized with furious delirium while standing sentry, and when carried to his barracks on Monks Hill, to expire in all the horrors of the black vomit, within less than thirty hours from the first attack; but during all this, not a single case of yellow fever, nor fever of any kind, occurred to the inhabitants of Monks Hill; that is to say, the garrison staff, the superior officers, the women, the drummers, &c. all, in fact, that were not obliged to *sleep* out of the garrison, or take the duties below, remained in perfect health. The result on the Ridge was not quite the same, but it was equally curious and instructive. The artillery soldiers (17 in number) never took any of the night guards, but they occupied a barrack about 300 feet above the marshes, not perpendicular above them, like Monks Hill, but a little retired. Not a case of yellow fever or black vomit occurred amongst them, but every man, without a single exemption, suffered an attack of the ordinary remittent, of which one of them died; and at the barrack on the top of the Ridge, at the height of 500 feet, and still further retired from the marshes, there scarcely occurred any fever worthy of notice." 14.

Another property of the marsh poison, is its attraction for, or adherence to, lofty umbrageous trees. In the territory of Guiana particularly, where these trees abound, "it is wonderful," says Dr. F. "to see how near *to leeward* of the most pestiferous marshes the settlers will venture with impunity to place their habitations, provided they have this security."

"The town of New Amsterdam in Berbice, is situated within short musket-shot to leeward of a most offensive swamp, in the direct tract of a strong trade-wind, that blows night and day, and pollutes even the sleeping apartments of the inhabitants with the stench of the marshes; yet it brings no fevers, though every one is well aware, that it would be almost certain death for an European to sleep, or even to remain after night-fall, under the shade of the lofty trees that cover the marsh, at so short a distance. All, too, are equally aware, that to cut down the trees would be a most dangerous operation in itself, and would certainly be productive of pestilence to the town." 14.

From these and various other facts our author draws two principal conclusions. 1st. That the marsh poison has no connexion with *the putrefaction* of vegetable substances—a conclusion to which we cannot entirely subscribe, for the reasons before stated; and, 2dly, that the marsh poison

cannot arise from simple humidity, in which we quite agree with our able and experienced author. We also agree with Dr. Ferguson, that the febrific effluvium has its principal source in the half-dried or drying margins or other points of swamps, and that complete inundation is generally a safeguard against the exhalation.

" One only condition, then, seems to be indispensable to the production of the marsh poison, on all surfaces capable of absorption ; and that is, the *paucity* of water, where it has previously and recently *abounded*. To this there is no exception in climates of high temperature ; and from thence we may justly infer, that the poison is produced at a highly advanced stage of the *drying* process ;—but, in the present state of our knowledge, we can no more tell what that precise stage may be, or what that poison actually is, the development of which must necessarily be ever varying, according to circumstances of temperature, moisture, elevation, perflation, aspect, texture, and depth of soil, than we can define and describe those vapours that generate typhus fevers, small-pox, and other diseases. The marsh and the stagnant pool will no doubt be pointed out as the ostensible sources from which this poison has ever sprung ; but the marsh, it has been seen, is never pestiferous when fully covered with water. At all other times it must present a great variety of drying surface, and both the lake and the marsh must ever possess their saturated, half-dried, and drying margins." 18.

Dr. Ferguson concludes this part of the subject with some remarks on other properties of marsh poison, besides those already noticed. He thinks there are no experiments yet made which determine whether the poison be specifically lighter or heavier than common air ; but it evidently possesses much attraction for the earth's surface. The official accounts of the last sickly season at Barbadoes shewed two-thirds more sickness on the ground-floors than in the upper stories of the barracks.

Dr. F. thinks it a proof of the attraction above-mentioned, that the malaria creeps along the ground, so as to concentrate and collect on the sides of the adjacent hills, rather than float directly upwards in the atmosphere. Another remarkable fact is, that it seems to be lost or absorbed by passing over a small surface of water. " The rarefying heat of the sun, too, certainly dispels it, and it is only during the cooler temperature of the night that it acquires body, concentration, and power." Currents of air also dissipate this poison ; and our author thinks that the West India Islands would be uninhabitable, were it not for the trade winds. Where this salutary breeze is interrupted through circumstances of season, or intervention of high hills, the consequences are most fatal. The leeward shore of Guadaloupe, for a course of nearly 30 miles, under the shelter of a very high steep ridge of volcanic mountains, never felt the sea-breeze, nor any but the night land-wind from the mountains ; and though generally dry, and devoid of marshes, it is inconceivably pestiferous throughout

the whole tract.* The same remark applies to the greater part of the leeward coast of Martinique—indeed to the leeward alluvial basis of hills, in whatever part of the torrid zone they may be situated, with the exception, perhaps, of the immediate sites of towns, where the pavements prevent the rain-water being absorbed into the soil.

As to remedy for malaria, if there *be* one, our author thinks "it must be found in the powers of cultivation, ever opening the surface for the escape of pestilential gases, and exhausting the morbific principles by a constant succession of crops."

The professional world is aware how decidedly anti-contagious is Dr. Ferguson's creed. Although we are not inclined to go the lengths which our author goes, on this much litigated question, yet we deem it right to extract a note which he has appended to his interesting paper on marsh poison, as declaratory of his sentiments.

"The yellow fever cannot be a contagious disease, *because*, during its utmost rage, it is confined almost exclusively, to a particular and very limited class of the inhabitants of the West Indies, viz. the newly arrived; and never affects the coloured people, unless it finds them under the same circumstances, of being newly arrived from a cold climate; although *that last class* is the most numerous, by at least ten to one, of the inhabitants, and is besides the most liable, of all mankind, to fall under the influence of every acknowledged contagion, such as typhus fever, plague, small-pox, measles, and scarlatina.

"It cannot be a contagious disease, *because*, even amongst white people, it has been proven from official returns, that the attendants on the sick are less liable to be attacked with fever than those who have never approached the sick-bed, and because it has also been proven, in a multiplicity of instances, that the disease is not communicable to the wounded, the surgical sick, the convalescent, and the healthy, though occupying the most contiguous beds in the same hospital.

"It cannot be contagious, *because* it has also been frequently seen, that when a regiment has been divided into separate detachments, the different divisions have been affected with distinct types of fever, according to the circumstances of temperature and locality of their respective quarters; and when one of them happened to be stationed in the locality of yellow fever, *(which is always at or near the level of the sea,)* that form of fever was incapable of being conveyed to the other detachments in the higher ranges of

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* "The point of Dungeness, on the coast of Kent, is a tongue of land appended to the great Romney marsh, and consists of an extensive bank of shingle of gravel, so dry, loose, and open, that, even in dry weather, horses sink in it nearly up to the knees. The forts and barracks are about four miles from the main-land, where grass begins to grow; yet there was no spot of that unwholesome tract of country more prolific of endemic fever during the hot Summer and Autumn of 1807, than this station." P. 21.

country, however frequent and indispensable may have been the necessary communication between them.

"It cannot be contagious, nor anything but a seasoning remittent fever, of violent and malignant form, peculiar, in a great degree, to the newly arrived, *because* all who have been debilitated by long residence in hot climates, and would, therefore, be the first to fall under the influence of a new plague, are in a great degree exempt from this form of the disease. And, lastly, it cannot be contagious, nor anything but the product of unwholesome locality, and uncommon drought of season, *because*, in the warmer countries of Europe and North America, where all the inhabitants are under the same circumstances as the newly arrived in the West Indies, from the effect of the preceding Winter, it has never been seen except in some particular low situations, where the heat has been steadily, for a considerable time previously, of the West India temperature; nor retained in them after that degree of heat has been changed by the change of season, nor transported from them, even during its utmost rage, to other localities in the closest vicinity, if of higher elevation, of better ventilation, and cooler atmosphere.

"The foregoing are not *vague assertions*, but matters of *fact*, that have been verified and recorded by the official returns of our armies in the West Indies for the last twenty-five years.

"As in every epidemic, where multitudes are in the course of being affected, every supposable degree of communication must, of necessity, be constantly taking place amongst the inhabitants of a crowded camp, or city; all or any of the believers in contagion may have their creed confirmed in any manner they please, from the dead or the living, by the passing events of every day; and it is only by reference to such facts as the above that the delusion can be cured, and that the observer can be brought to distinguish clearly between the agency of *epidemic* and *contagious* influence. Those, however, who have only *read* the reports of panic, from the theatre of the epidemic, will seldom be cured of the delusion; no more will those who have *seen* the disease, but have fled in affright from its supposed contagion; but all who are compelled to *remain* within its epidemic current, and *witness* the progress of its successive invasions, through the recurrence of sickly seasons, must infallibly have their eyes opened to its real nature, if they be at all capable of distinguishing truth from error.

"In opposition to the fact that has been so often verified in every colony of the West Indies, that the sailors of merchant ships landed with yellow fever, never infected the crowded, unwholesome suburb-lodging-houses, to which alone they had access, it has been said with much feasibility, to have been *imported* in ships. But this is another delusion arising from the well-known fact, that newly arrived strangers are generally the immediate and most striking victims of every epidemic; and hence our most thoughtless intemperate sailors, when, at these dangerous times, they are thrown into

the unwholesome anchorages of the West Indies, are not only the first to suffer from the epidemic in its course, or about to begin, but they are denounced as the *importers* by the prejudiced vulgar; and the accusation is loudly echoed, even among the better informed, by all who wish to make themselves believe, that pestilence cannot be a native product of their own habitations. The incomprehensible punctuality of ships regularly arriving at some particular sea-ports of Spain and North America, fraught with the pestilence of yellow fever, at the precise stage and period, *and at no other*, of those hot and dry seasons that assimilate them to the unwholesomest of the West India towns, can, therefore, be no more than a fiction of prejudice,—a delusion of panic terror." 29.

We consider the profession, and especially the tropical visitor, as under much obligation to Dr. Ferguson, for the valuable facts and observations contained in the foregoing paper, of which we have offered a more ample analysis than we otherwise should have done, had it been published in a form likely to travel widely through the profession.

XI.—On Intermittents.

An Essay on the Remittent and Intermittent Diseases, including Marsh Fever, Neuralgia, Dysentery, Cholera, &c. &c. By John M'Culloch, M.D. F.R.S.

[ANALYSIS.]

We agree with the author, that there is hardly a fact better established in medicine, than that ague is produced by malaria. He thinks it is by no means proved that there is any other cause—at least of the original disease, or first attack, although various causes may have the power of re-exciting the disease. We shall not follow Dr. M. through a detail of the common phenomena or symptoms of ague:—they have, of late years, been presented pretty generally even to English practitioners. But we shall here notice some very interesting observations which our author has made on certain states of mind attendant on, or connected with intermittents, whether obvious or obscure in their forms. This state of mind is a peculiar irritability or despondency, more especially revealing itself in the cold stage, or incipient movements of the disease.

"It is in fact at times, the sole cold fit, or almost the only disease; though a watchful eye may always discover that it is connected with that collapse of features or change of expression which attends every cold fit of intermittent, and, very commonly, with that peculiar physiognomy, easier recognized than explained, which, to an observant eye, is always sufficient

to indicate every disease, general or local, connected with intermittent, or arising from Malaria; an appearance which, when more strongly marked in the pallid hue of the face and the shrinking of the nose, ought to decide the question, even to the most negligent observer.

"Of its true nature and cause, be the moral results what they may, no doubt can be entertained, because of the suddenness of the attack, and of its periodical character; and it thus happens that in almost a second of time, and even in the midst of active good humour, or passive feelings of comfort or happiness, the fit of ill temper, or irritability, or despair, of a moral change under modes too various to detail, will occur, to last as long as the cold fit would have lasted had it been present; or lasting, when that is visible, just as long as the duration of the peculiar physiognomy which I have described. To be aware of this fact and this cause, on the part of the patient's circle, is to be furnished with reasons for making that charitable excuse which is seldom made, if ever, for what self-control might be supposed capable of preventing, and perhaps not much oftener for what is unavoidable; so rare is this species of charity: for the patient to be aware, himself, of the cause, is to furnish him with a guide for his own conduct in these circumstances, and a check over the display of those feelings; while it is also to offer him the consolation of knowing that it is his body rather than his mind which is diseased; that his perverted temper is not a moral and voluntary fault or failing; but as involuntary as it is capable of being remedied." 246.

Such a disorder of mind may be readily confounded with hypochondriacism. Such are the milder moral derangements in the milder chronic intermittents.

"But in severe cases of both, the united state of irritability and despair is apt to produce the far more serious effects of stimulating the patient, at least, to think of suicide. This insane desire is a very common complaint of patients labouring under intermittent, and a very frequent source of great alarm and horror; while it occurs equally in patients who, before that, were cheerful, as well as youthful, in the female sex as in the male, in persons where, either from previous knowledge of their opinions and characters, or from observation in the absence of the fit, we are quite sure that it cannot depend on a wrong state of mind or of opinions, but is as rigidly a portion of the disease as it is found to be a periodical one." 248.

That such states of mind are very frequently produced by corporeal derangements we well know—and that these bodily affections are not seldom dependent on the impression or reception of malaria, we have strong reason to believe. How generally malaria deranges the functions of the viscera, and especially the liver, stomach, and other digestive organs, need not now be told; and that these derangements produce the most dreadful mental despondency, and lead often to suicide, are facts that are every day becoming more obvious to the attentive medical observer.

It is very important that these effects of intermittents should be known and understood both by patient and practitioner—since a knowledge of the real causes will be a great relief to the minds of those who, under such circumstances, are haunted for years with this species of phrenzy or mental alienation. The desire for suicide is often exceedingly temporary, even when it is most overpowering; and, if controlled with resolution, it soon passes away. To be aware, therefore, of the real nature of the adumbration, may frequently tend to obviate its dire effects.

"There is another remark yet, which it may be worth while to make on this mental disease, whether or not it is really connected with intermittent in all cases. I have clearly ascertained it to be so, at least in some; or rather, every instance of the desire or attempt in question under this peculiar variation, which has come under my knowledge, has been a case under intermittent. As relates to the desire, the simple fact is, that the patient feels a species of antipathy against some peculiar part of his body, added to the general disordered feeling, or he longs to commit the act by wounding that particular point; while, whether his aberration amounts to the desire of suicide or not, this very point or place is the one eternally forcing itself on his imagination as an object of hatred and revenge. And so perfectly insane is this feeling, that I have been informed by more than one patient who has suffered from it, that there is no conviction at the same time that death would follow; or rather, that the impression is as if the offending part could be exterminated or cured by the injury, and that the patient would then be well. And that suicide has actually been committed under this particular aberration, is well known from the more curious records of physic; while I need not do more than suggest one peculiar part of the body, which has been often the offending and selected point; the act having been sometimes also, but not always, followed by death." 251.

Dr. M., we have no doubt, alludes to those cases of monomania, where men have severed the genital organs, from some momentary impulse of local antipathy of feeling, which can only be known to the individual at the time.

"The philosophy of this, as far as my opportunities of observation have gone, and on the indicated ground of explanation, for these cases at least, is, that while the irritable, or jointly despairing and raging or angry state of this chronic fever is present, there is also a particular part of the body affected by an uneasy but undefinable sensation, such that the mind constantly reverts to it as a source of suffering. And if this local affection is not a neuralgia, or a condition of absolute pain, yet it is a local and nervous one of an analogous nature, always returning to that one point under the same stage of the fever or delirium. When, as is not unusual, it is seated in the head, it is even distinguishable by a dull pain, or a confusion, or a sense of 'buzzing' (for thus it is described by patients), in one fixed place, indicating pretty clearly its real nature: while in that particular case,

I have the assurance of such patients, that the suicidal desire is exclusively directed to that individual spot, and that while a pistol would be the only acceptable mode, there would also be no satisfaction unless that were directed to this actual and only point. But I will cease, and allow physicians to exert on this solution of no easy question, the ingenuity which has not hitherto succeeded in producing an intelligible explanation." 253.

Our author inclines to the opinion of STRACK, that an intermittent fever may consist of only one paroxysm, finding its natural termination after one attack—" and consequently that the fever called ephemera is, in reality, often a single intermittent." Strack observes, that this is the disease which terminates in an eruption on the lips. If Hippocrates is any authority on such a nice point, he may be thrown into the scale with Strack and our present author.

It was, and perhaps still is, an opinion (medical as well as popular), that agues, at least those of Spring, are salutary. This notion was entertained by Boerhave, and by many great names in our own country! Dr. M. thinks it probable that this idea arose from the fact, that ague sometimes removes a chronic disease—or from another fact, that men not unfrequently become fat after a sharp attack of intermittent fever, especially in Flanders. It is curious that this obesity is not prevented by enlarged spleens and other visceral derangements, in many instances :—nay, even the daily paroxysms of ague, if not very violent, are sometimes compatible with an increase of corpulency. In whatever way we may account for this, the fact proves that ague, under ordinary circumstances, is not very prejudicial to the constitution, unless it be protracted or severe. But, on the other hand, we often see rapid emaciation, great loss of muscular power, and visceral derangement superinduced on intermittent fever in all, but especially in hot and unhealthy climates.

ANOMALOUS, OBSCURE, AND SIMULATING INTERMITTENTS.

Hitherto our author forbore to notice those epidemics, where very marked local inflammations of particular organs were such prominent features as to render the mere fever of comparatively little moment. He reserved them for this place, in order that he might the better illustrate the anomalous, localized, or simulating intermittents, a knowledge of which he considers as of paramount importance. These local inflammations affect almost every structure in the body, from the muscles and ligaments to the most vital organs—simulating or nearly equalling genuine idiopathic inflammations of these several parts, and introducing great diversity of opinion among practitioners as to the nature of the disease, and the proper mode of treatment. If these phlegmasiæ occur, and all must acknowledge that they do occur, in marsh or continuous fevers, so it

is reasonable to believe that they are attendants on intermittents, which are only kinds of the same fever, and thus they may be productive of great error or delusion.

" The inflammatory or local affections, be they what they may, may be slender and truly supplementary; but they may also prevail so far above the fever, as in remittent, that they may appear to be a distinct disease, or the superior one; while if, further, the local affection should be permanent or continuous, when the fever has its intermissions, and perhaps long ones, as in quartan, and while, still further, that fever may not be very conspicuous compared to the local symptoms, it is easy to see that erroneous views and erroneous practice may follow." 280.

Dr. M. apologises for dedicating so large a space in his work to an investigation of the chronic forms of anomalous and simulating intermittents; but we think he need not fear censure on this account, for we verily believe this chapter to be one of the most original and valuable in the whole work. We regret, indeed, that the tedious tautological *manner* in which he treats his subject, will deter most of the reading practitioners (not a very large proportion) of the day from profiting by his researches:—since few of them will be at the pains of reading a passage twice, if they do not fully comprehend it at the first glance.

The first subject of investigation is the apoplectic state, which sometimes commences the attack of intermittent as well as remittent.

" This state is not limited, either to the first attack or to the acuter forms of these fevers, although in Italy that appears to be the most common mode of its occurrence; as I have seen, in this country, a perfect apoplexy, to the eye, in all its characters, sufficient to deceive both the attending practitioner and the friends, lasting for eight hours, and occurring in a chronic tertian of many years' standing, as a substitute for the cold fit." 287.

The danger that may result in practice, from an error here, is obvious enough. Venesection, to the amount generally employed on such occasions, might occasion palsy, or even death—at all events, it would aggravate the symptoms. Dr. M. has seen local and limited paralytic affections produced by this practice, in many instances, " and in more than one, a perfect and incurable hemiplegia." We doubt whether Dr. M. could positively determine that a hemiplegia was thus produced. In common hemiplegia, permanent hemiplegia, there is generally an effused clot of blood; and if so, how can it be positively ascertained whether or not there is extravasation in consequence of venesection unnecessarily employed, without the aid of dissection? By this we do not mean to impugn the doctrine of simulated apoplexy. At page 455 of the 8th volume of this series, we have stated a very remarkable instance in our practice, and we could adduce several others; but we think Dr. M. has carried doctrine too

far in the above cases of hemiplegia. We could more easily conceive that death would ensue from copious venesection in simulated apoplexy than that permanent hemiplegia should ensue.

"A modified condition of this nature, is the lethargic or comatose state, which occurs in the chronic intermittents as well as in the remittent of that character, and which also sometimes ushers in the first attack of an intermittent, in the same manner as the more perfect apoplexy does. It is incumbent on the practitioner to investigate this symptom or condition where it occurs, much more accurately than it is the custom to do; while it is abundantly easy to discover whether it belongs to this disease or not. To view it as an independent disorder, and as arising, according to the popular and fashionable error, from what is called a flow of blood to the head, is a most unpardonable mistake, from its leading similarly to injurious practice; to bloodletting and to cupping: the consequences of which also are, sometimes paralytic affections, at others, slight epileptic ones, or even more decided fits of that disease; in others again, a modified fatuity, or a diminution of the intellectual powers, or a condition little short of absolute idiotism: and, even in the least evil event, a long train of debility and nervous symptoms, with the further frequent consequence, as in the former case, of rendering chronic a disease which would otherwise have terminated by itself, or of protracting much longer and more severely, a disorder already chronic. It is one of the cases, and one of the modes of practice, yet but one out of many, which so often causes medical interference to aggravate the diseases of this nature. I shall only further remark, that this error is most generally committed, as I have seen in numerous instances, and as perhaps might have been anticipated, when the patient is corpulent, or of a certain form, or advanced in life, or when suspected of indulgence in eating and drinking: when it will be fortunate if he escapes bloodletting or cupping, to be simply deprived of the use of wine, or restricted in diet; though even practice of this moderate nature is not always without its bad effects." 289.

Paralytic affections, as occurring in these masked intermittents, are next adverted to by Dr. M. Dr. M. has not found any practitioners "who seem to know that palsy is the frequent produce of malaria, or the substitute for intermittent fever, or a symptom in that disorder." We believe that such cases are not generally known or suspected by British practitioners; but it has long been known that local paralysis, and that too of a very indomitable nature, is a common effect of what is called in hot climates, especially India, "*a stroke of the land-wind.*" Thus a soldier or sailor falls asleep, with some part of the body exposed to the night or land-breeze charged with miasmata from a jungly or marshy district;—and he awakes with the part completely paralytic, never more perhaps to be capable of sense or motion. This is a fact of frequent occurrence, and is strongly confirmative of our author's views.

" Apparently as a substitute for, or modification of, apoplexy or coma, however obscure the exact cause may be in either case, the first attack of an intermittent is sometimes a numbness, or a more perfect paralysis, varying in its extent as well as its severity, so as to affect only a few muscles, in different parts, or else to produce an absolute hemiplegia; which, however, may also be slight as well as complete, or may consist in a numbness or loss of feeling to that extent, without depriving the patient of his command over the muscles. Should the truth of such a cause for palsy be denied on the ground that we cannot explain its action, it must be recollected that it is no more a mystery than the production of apoplexy in the same cases; while the possibility is confirmed by the numerous instances of the same nature which occur, limited to single, and sometimes very small nerves, and either original, or succeeding to painful conditions of those. Every thing indeed tends to show, that if the diseases produced by Malaria are not, purely, and all, mere affections of the nervous system, the principal action of this poison is on that system, and the greater proportion of the disorders which are caused by it, disorders of the nerves. Whether the paraplegia so often occurring from exposure to cold, and especially among soldiers in bivouacs, is sometimes, or ever, a disorder of this nature, is a question that I cannot answer from such evidence as I have been able to procure, however this may be suspected in some cases." 292.

If these paralytic affections sometimes usher in a new intermittent disease, being, like coma, a substitute for the cold stage, so has our author seen them occur in the chronic form, and both under circumstances that could admit of no doubt. Thus, in a situation exposed to malaria, and never free from its diseases, in one or other form, a whole family, with the exception of two members, had ague, while these two were attacked with a paralytic affection suddenly—one in the leg and thigh—the other in the arm. In both these individuals, the paralytic affections as suddenly disappeared on the evolution of a regular quotidian ague. The practical error here is the same as in the simulated apoplexy—" the imagining a *flow of blood to the head*—and palsy to be treated by bleeding and evacuants." The result, our author observes, is, in severe attacks, to render that permanent which would only have been temporary, had the doctor not interfered, or had proper means been employed! Of such cases, he says he could state a great number from his own observation. The previous history of the patient, his diseases, his residence, and his treatment, left no doubt in his mind. Dr. M. mentions a few cases from the practice of others, stating the mere facts, and leaving it for the reader to draw his own conclusions.

Two sisters in one family, about the age of 30, were strongly marked with that complexion and physiognomy attendant on splenic disease, and were subject to those strange and anomalous symptoms which spring from chronic intermittents. They had spent a large portion of their time in one

of the most pernicious districts of England, and the frequent occurrence of "spasms" led to bleeding in both cases. This was followed by more nervous symptoms, and led, of course, to more bleeding and purging. "The result, in one of these patients, was hemiplegia, and in the other paraplegia—and further bleeding being resorted to for these disorders, both of them died."

The other case was that of an officer, who is supposed to have had an intermittent fever at some previous epoch. "An inexplicable palsy of one limb was here the first occurrence, and, in a man of a constitution and time of life when the usual vulgar cause could not be suspected. Bloodletting was followed by palsy of the other leg; and, on repeating it successively, both arms, one after the other, became similarly affected, so that the patient at length became and remained almost an immoveable carcase." The final issue of this melancholy case is not yet known. Cases are quoted from Keratry and Etmulla bearing upon this point, and then the following is introduced, not very flattering to the "healing art."

"In this example, an officer, a young man, who had suffered from the remittent fever in Spain, was suddenly seized on an English parade with a fit, or what is commonly called such, which was considered as apoplexy; being in reality a return of his intermittent. Being placed under the usual discipline, he was rendered partially paralytic, and at length, under two years of the general routine, became the mere shadow of a man, while previously most robust; losing also, with his strength, the better part of his intellect. Determined at length to join his regiment in the West Indies, he embarked in a transport, where, from there being no surgeon, all medical practices were suspended; from which moment he began to recover, and concluding just what I have here concluded, was in a few months restored to perfect health." 298.

This consequence of the malarious impression (paralysis) is generally admitted by those continental writers who have practised in unhealthy localities, but they have overlooked the share which bleeding and other evacuations may have had in the production or aggravation of the paralytic affection. Dr. M. assures us that his own experience on this point is wide and ample—and that it is far too precise to permit him to surrender his own judgment to the authority of others.

"Of partial palsies in the face, and of more general ones in the legs and in the arms, traced by the patients to cold, and, under my own views, appertaining to intermittent, I have known many instances rendered complete or incurable by bloodletting, when, from my own experience in similar ones, I have reason to believe that they would have passed away had the physician not interfered." 300.

Dr. M. takes occasion here to criticise pretty sharply some recent writers on palsy, for not even noticing, as one of its causes, the impression of malaria, or its consequence intermittent.

" And when I recur to a long series of observation, much more on the practice of others, of course, than in my own, I find such a mass of cases where it was to be often proved, very often suspected, that the paralytic affections arose from this very cause, that I am compelled to conclude that, in the first place, the cause in question is a very general cause of palsy, and secondly, that the error of practice arising out of a wrong theory and the common one, is the source of the far greater number of incurable palsies daily met with in society ; the increase of which also has been notoriously great for some time past, while it bids fair to proceed in augmentation, as the diseases of Malaria, from whatever cause arising, are themselves increasing, and as the improper practice to which I have alluded becomes also daily more prevalent." 302.

Besides these more sudden and palpable paralytic affections attendant on masked or open ague, there are others of a more gradual nature, which it is necessary to point out. These, perhaps, will be best understood by the statement of a case. This was an instance of a relapsing or chronic quotidian, where no previous local affection had existed. During the relapses in question, which generally lasted six or eight weeks, there came on gradually a feeling of weakness in one leg and foot, which increased so much during the disorder, that the patient could hardly put that foot to the ground.

" And although there was no pain or Neuralgia, it was easy to trace with the finger the course of the fibular nerve from the middle of the leg into the foot ; as the slightest passage of the finger over it was attended by the well-known tingling sensation produced by a pressed nerve ; while a stronger pressure where it is nearest the surface, gave the equally well-known shock produced by striking the elbow, in another superficial nerve. It was obvious that the muscles chiefly affected in this case, were those to which this nerve principally belonged, and therefore that it was in a diseased state ; that derangement appearing to consist in a diminution of its energy or power, added to an increased or morbid sensibility." 303.

The analogy of this to the proper neuralgia is, Dr. M. thinks, evident ; and it must, in his mind, be considered as a modified degree of this malady. In subsequent relapses, the affection of the nerve was exasperated, and, ultimately, the ulnar nerve of each arm became similarly affected, with the same inability to extend the arms, without immediately feeling the tingling, as of a compressed nerve, along the whole course, from the arm-pit to the fingers. Dr. M. thinks that this affection of the nerve, whatever its true nature, must have been strictly local, or what might be termed anatomical —that is appreciable by dissection. In the case now related, the nerves of the arms recovered, but those of the legs remained disordered for many years afterwards.

Dr. M. proceeds to quote cases from other writers, which, whether designed or not, support the doctrine which he is advocating respecting the

connexion between palsy and intermittent. Thus, Sauvages quotes a case from Chaptal, under the very term tertiana hemiplegica, which Dr. M. thinks might have opened his eyes to the connexion in question; but it did not. In another case, quoted by the same learned nosologist, the paralytic affection came on every day, and disappeared with the accession of the proper quotidian.

" Palsy in the form of paraplegia, of a periodical and quotidian intermitting character, is also described by Torti, from Chaptal. Where the same writer, from the same authority, quotes a similarly periodical hemiplegia absolutely perfect, while it was quotidian and intermitting, lasting also for ten hours, he remarks that it was always increased by purging as well as by bloodletting, and that on changing the practice, it was cured by bark in nine days. This particular case is of value, as a warning to practitioners; and, from the nature of the attending and preceding symptoms, perhaps of somewhat more value than common." 310.

A case from Morgagni is still more remarkable. In this, one side was permanently paralytic, while the other was attacked every evening with a palsy, which disappeared in the morning—the patient, after seven or eight such fits, dying of peripneumony. Various irregular cases of this kind, where the paralysis was attended with convulsions, are noted by the same author. Neither Morgagni, Sauvages, nor any of the writers on palsy, however, appear to have suspected a connexion between intermittent and that disease. The connexion of apoplexy with intermittent has been largely noticed by Ramazini, who describes the apoplexy as occurring at all periods of the disease, as well as at its commencement. This connexion was also known to Morton, and its nature must have been appreciated, when he prescribes bark for the cure of the apoplexy, as well as the ague. Theon de la Chaume describes an epidemic tertian, accompanied by apoplexy, as prevailing at Ajaccio, in two different years, 1773-8. The same has been often seen at Bresse, the most pestiferous part of the Lyonnais.

" It is a noted fact, that it is the effect of chronic or habitual intermittents to injure or destroy the intellectual faculties, as I had occasion to point out already when treating of remittents. This is notorious in the countries where these disorders prevail, and very remarkably, as I formerly said, in the Maremma of Tuscany, where even absolute idiotism from this cause is common; the fact being marked, even to cursory travellers, by that apathy, listlessness, or indolence of mind, gradually approaching to fatuity, which I formerly described. If the cause be obscure, it cannot well be more obscure than every thing else which belongs to the action of malaria; while the fact of the universal influence of this poison on the nervous system, local as well as general, leaves no difficulty, at least in believing that it may produce such effects on the mind." 322.

But ague, for a long period of its existence, only affects the mind with irritability, or increased sensibility, as evinced by peevishness, exaggerated views of evil, increased sensibility to bodily suffering—to say nothing of nervous sensations beyond number. In process of time, however, a train of opposite effects come to prevail. The mind becomes, as it were, torpid, as evinced by listlessness, and submission to present evils, with scarcely a wish to escape them. This is a striking feature in the inhabitants of pestiferous countries. Dr. M. relates some curious instances where, in people who had laboured under this disease, the organs of sense lost their aptitude for pleasurable sensations, "their complaints being, that beautiful objects, such as pictures, natural scenery, &c. which, before that, or when in health, had been most pleasurable or engaging, seemed to make no impression at all on the sense."

"From such patients I have received also the same complaints and statements, with respect to the other usual causes of simple pleasurable feelings; and very particulary from those who, as musicians, were accustomed to delight in music, not less from science than feeling; those being, that they seemed to suffer under a positive insensibility as to what used to be a source of the most refined delight, although labouring under no affection of the temper, nor any of those sensations commonly called hypochondriacal. And thus have others complained that the most grateful odours had ceased to give pleasure, that the scent of a rose was not only powerless, but produced absolute pain by reminding them of what it once was; while every attempt to revive the former associations connected with this and other similar objects of delight, was unavailing." 325.

This *mutatis mutandis*, Dr. M. thinks, is precisely the progress in those cases where single nerves are affected, instead of the whole cerebral system. "In the neuralgia, the first action of the cause is an increase of sensibility, reaching to the highest imaginable degree of pain;" but the progress of this is to palsy—"or the excessive sensibility is succeeded by a diminished one," as if the sensibility were exhausted by the previous over-excitement.

After many ingenious and interesting observations on *periodical* mania, vomiting, hysteria, palpitation, and other irregular modes or forms of intermittent, our author comes to the occasional connexion of rheumatism with malarious diseases. Dr. M. without attempting to unravel the difficult pathology of this disease, trusts that he will be able to prove that there are cases which belong to intermittent—"cases bearing an analogy to certain modes of neuralgia, and possibly differing from it, by the affections being seated in the numerous and minute ramifications of a nerve, instead of attacking a trunk, or a leading branch."

"The most simple case of all, while it is one that ought never to be mistaken, is that where a rheumatic pain in some particular muscle is

strictly periodical, returning and ceasing in regular paroxysms. In such cases, the part affected may sometimes be exceedingly limited, occupying only a few fibres of a muscle, though, even then, the pain is often severe; while in others, the extent may be very considerable. Thus even the whole body may suffer under it; or rather there may be so many different muscles affected, in some place or other, that scarcely any movement can be made in which some one or more of the disordered portions is not brought into action; conveying thus, to the patient, the feelings as of an universal rheumatism." 369.

Such a periodical recurrence, he observes, might satisfy a practitioner respecting the true nature of the disease; but it will often be attended with other symptoms, explanatory of its cause. Thus, it will be found to occur in persons who have been previously affected by intermittents, forming in itself a period of relapse, and a substitute for the more common modes of chronic disease. In other cases, the rheumatic pains will alternate with some of the other marked symptoms belonging to this disease:—or it may cease on the appearance of the common symptoms of intermittent.

Dr. M. tells us that there is a certain *physiognomy of the cold stage*, however wanting the actual feeling of cold may be, which is never absent at some period or other of this, and of all other malarious diseases, and which has, on endless occasions, enabled him to pronounce, from the first sight of the patient, on the nature of the disorder to which he has been summoned, with the assurance of its mysterious nature by the medical attendant. The power of distinguishing this physiognomy, however, requires the TACTUS ERUDITUS of the experienced practitioner.

The kind of rheumatism here alluded to, as connected with intermittent, will of course, be generally of the chronic kind, and our author does not attempt to say what proportion they bear to the common rheumatism, dependent on other causes; but he thinks it probable that they form a considerable proportion of what pass under the name of chronic rheumatism.

"The more serious question remains; whether that which is esteemed acute rheumatism, a disorder too well defined and too familiar to require description here, may be a mode of intermittent. I do not mean to suggest at present, that every acute rheumatism is a disorder belonging to this class of diseases, or that, as in the chronic variety, there are not cases which are independent disorders, or affections generically different, although it seems to me, that even this is a question far from decided the other way. The question at present is, whether there are not acute rheumatisms of the most regular form, which are truly modes of the quotidian intermittent, or of the remittent, possibly, originating in the same causes: and if it shall be decided that this is the fact, and that there is also an acute rheumatism generically different, then we shall probably be able to explain the causes

of the contests so long maintained respecting the use of bark in this disease.

"The facts which would seem to prove this opinion are chiefly these. There is a periodical exacerbation, if there is not always an absolute remission of the pains; and the duration of the disease is very analogous to that of a remittent, or of one period of an intermittent. The causes correspond, if they are not identical, while the remedy is often the same; since, after all that has been disputed, there is no doubt that many cases are cured by bark, and that bloodletting is not only often ineffectual, but pernicious; its action altogether, being, in fact, very similar to that which it exerts on remitting and severe intermitting fevers." 375.

Thus, while in acute rheumatism, the misapplication or abuse of bloodletting often produces the chronic disease; so, a similar practice frequently induces the chronic state of intermittent—or converts an acute and terminable case into a durable one.

"It is not impossible also that the termination of the pains of acute rheumatism, succeeded by affection of the brain, and so often producing death, may be an analogy to what happens in other cases of intermittent diseases, where one local affection is exchanged for another, or disappears, to be replaced by an augmentation of the general fever." 376.

We are so far outstripping our limits that we must pass over our author's investigation of those cases of pleuritic and catarrhal affections, anginæ, hepatitis, gastric and splenic disorders, ophthalmia, &c. which occasionally assume a remittent form, and depend on a malarious cause. Every man must have repeatedly seen rheumatism of the intercostal muscles mistaken for pleurisy, and venesection injuriously, or at least injudiciously, resorted to for its cure.

"If I have seen constitutions utterly ruined by a perseverance in this wrong practice, if I have seen patients condemned to believe themselves labouring under consumption in these cases, with all the expensive and vexatious consequences that follow such an error, there are doubtless many physicians to whom the same facts have occurred." 380.

Yet it is by no means difficult to distinguish between the internal and external complaint, even without the aid of percussion or auscultation. The following case is interesting, and we shall introduce it here.

"The patient was a young man in the higher rank of life, and the pain in the side was termed pleurisy, though no cough was present, and very little fever; so little, that not even confinement to bed was necessary. Bloodletting was resorted to, very actively, and was followed by increase of the pains; and, not to prolong a tedious history, these pains continued or returned occasionally, during nearly a whole year, while, during all that time, this remedy was repeated, often, many times in a week. If it was plain that this, by merely negative reasoning, must have been a rheumatic disorder, there was even much plainer evidence, in the periodical returns of

the pain, after some weeks, that it was also the intermitting disease; while the physiognomy and appearance marked, once in every day, a decided cold stage. Still further, after about five months, there came on a pain in the shin-bone of one leg, regularly periodical, and lasting five hours; during which, the rheumatic pains among the ribs diminished or ceased, yet without leading the physicians to a correct judgment of this case, as it ought to have done; being a true neuralgia, interchanging partially with the original intermitting rheumatism." 382.

This case was considered to be a wonderful and mysterious one, and it was proposed to make an incision through the periosteum, on a supposition that the bone was diseased. The patient's health was greatly reduced, and he did not recover strength for many years, when the disease terminated in a regular ague that has harassed him ever since in a chronic form!

Among other intermittent rheumatisms, Dr. M. notices lumbago, which is, at least sometimes, a modification of the class now under discussion. One case is mentioned where what was called a regular lumbago, and treated as such, " was suddenly and spontaneously removed, and immediately succeeded by the common neuralgia of the face." A similar case is recorded by Dr. Pearson. Dr. M. considers those pains situated in non-muscular parts, as improperly denominated rheumatism. They belong to the neuralgiæ, as those of the face and head.

" There is something singularly periodical in the attacks of a catarrh which often comes on in Summer, and, as it would appear, most commonly from exposure, not simply to heat it would generally seem, but to heat where vegetation is present. This well-known disorder is produced by hot-houses or green-houses; and, in the public estimation, it is particularly caused by hay-fields. Hence the term hay-fever, lately become fashionable." 394.

Dr. M. has not much experience of this disorder, but he knows that it is one which is aggravated by the remedies which aggravate intermittents—namely, bloodletting and other evacuations. Dr. Bostock, who appears to have suffered from this complaint in person, has given a full account of it.

We must pass over a great many complaints of a periodical character, and which are not improperly classed among those dependent on a malarious origin, in order that we may dedicate a few pages to therapeutics.

TREATMENT OF INTERMITTENTS.

Dr. M. does not pretend, of course, to offer any new cure for this class of complaints; but he has dedicated a large space to comments on those modes of treatment which have been employed by others. He observes, that the remedies which will cure a recent intermittent, will be much less efficacious in one of long duration or relapse—but he does not conceive that any distinction is necessary as to the types of intermittent maladies—

"since, in all of these, the remedies are the same," requiring only such modifications as the obvious circumstances of the case may indicate.

The simplest remedies are those which act on or through the mind, and —"their number is far greater than I choose here to record." Their action is undoubted—but they are best suited to new attacks of new diseases. There is no evidence of their efficacy in remittents, and it is curious that remedies of this class have been more successful in stopping tertian than quotidian agues. Without *faith* in their power they are nugatory—and this explains the rationale of their operation in most cases, in conjunction with disgust, fear, and other strong mental impressions. Under this head (Dr. M. thinks) must be classed "a vast catalogue of internal medicines of the most discordant properties or of no properties at all." He is of opinion that bark itself sometimes acts in this way—namely, by *confidence*. Spiders' webs may act by disgust or horror, and so on.

The next class of remedies includes those which make a powerful impression on the system, and especially on the stomach, immediately before or soon after the commencement of the fit—by which the paroxysm is prevented or abridged. Alcohol, opium, spices, are the basis of this class. Those medicines which we term tonic, as bark and arsenic, are next noticed by our author. He cannot conceive why they should have the term *tonic* applied to them, "so unphilosophically lax are the ideas attached to that term." After some general observations on the management of the three stages of the paroxysms, Dr. M. comes to make some comments on the administration of particular remedies, beginning with the bark. Between the foreign practice of giving as large a quantity of bark as can be taken, within one, two, or more intervals, and then ceasing for a time, and the English method of giving the medicine in less quantities, "persevering without limit," Dr. M. finds it difficult to decide, as to the comparative advantages.

"But while I must return to this question immediately, one remark seems well founded, however, often neglected; and it is, that the perseverance in bark beyond a few days is nearly useless; while, if it has been said that whenever it offends the stomach it produces no good effect, this is contradicted, as I shall presently show, by other physicians. And further, it seems often true, while even less known, that where a large dose is inefficacious, a small one is often useful; or in reality, that ten or fifteen grains will sometimes produce a better effect than a drachm. Of the various preparations, the now common combination of kina, its sulphate, seems the only one which deserves a preference to the bark in substance, while it will probably prove to be in every instance preferable." 445.

Dr. M. next gives the opinions of various authors as to bark; but these we need not enumerate, nor even notice. We shall stop for a few minutes, however, on the subject of arsenic, a remedy that "has been lauded beyond its merits, and often also condemned and shunned, rather from the fear ex-

cited by its name than anything else." The following sentiments coincide very nearly with our own experience.

"I have little, therefore, but my own experience to judge from; and this is, in the first place, that it is less efficacious than bark in diseases of a highly febrile character, and of long duration; or that as the intermittent approaches nearer to the remittent, arsenic becomes an uncertain remedy, and that in the very chronic disease it appears to me to possess no power at all; though I know not that, in these latter cases, it is more nugatory than any other remedy. In a new and a very simple intermittent, and in the tertian particularly, it seems to offer a more rapid remedy than bark, while its superior convenience is manifest.

But if I were to compare it with bark in those cases where the disease puts on the anomalous symptoms or characters which I have described, I should often judge it a more effectual remedy than that; and although my own experience is far from sufficient to decide this point, I have also found it the best medicine in all the cases of the most purely local affections, or in the neuralgia; not but what it fails much too often, even in these, and particularly where they are of long standing." 452.

Dr. M. objects to the form in common use, Fowler's solution, and assures us that the common white arsenic, in powder, has succeeded when the solution has failed. The sixteenth part of a grain is that which Dr. M. employed, repeated three or four times a day, rubbed down with lump sugar.

"With respect to the superiority of arsenic in substance to its neutral salt, I may quote the experience of a friend, who, residing in a district where tic douloureux is extremely common, and where the solution seldom succeeded, now reports to me that he finds the powder almost infallible; giving it without the least inconvenience to the extent of 1-12th of a grain for a dose, and finding that its utmost limit is 1-8th, which can seldom, however, be endured, though having administered 1-6th, without further evil consequences than gripings." 453.

This information is important if true; but the apprehension of mistakes in the shops will prevent many from giving the common arsenic a fair trial.

"As this remedy is held to be attended with danger, and also with ultimate bad consequences, I must here bestow a few words on that subject. When given in excess, short of its properly poisonous effects, the symptoms are various, but the following have been observed; headache, sweating, tremors, nausea, vomiting, griping pains, with spasms of the lower extremities, and, sometimes, affections of the urinary passages; more frequently a red eruption on the skin, with swellings about the eyes and other parts, resembling that produced in what is called a surfeit, from eating muscles, and, in particular persons, many other substances. I must also remark, that as, in this latter case, there are individuals who thus suffer from it, even in the minutest doses, and that the eruption of the skin appears to be one of the most common effects, generally, however, limited to the face and the breast.

That effect, together with slight nausea, are the ordinary and commonly the sole ones, unless the dose be excessive." 454.

Dr. M. has never known any ulterior or permanent ill consequences arise from the use of arsenic. "They are all easily removed by brandy, as is the common surfeit, or by opium; and if not they cease of themselves in a few hours."

In some constitutions, and after a few days' exhibition of the arsenic, the pulse becomes quickened, and the skin hot and dry; while there is that peculiar feeling of languor and debility that is known to result from mercury. Flatulence and sense of distention very often attend this condition. In such cases it is prudent to desist, though our author has not seen any bad consequences result farther than the above. He does not believe that paralysis has ever been produced by this medicine.

On the cold bath, mercury, and purgatives, Dr. M. makes some cursory remarks, which we pass over. They are, generally speaking, condemnatory —excepting when the above means are used with great caution. Against purgation in particular, Dr. M. entertains considerable aversion.

"But in the chronic varieties, and in these, in proportion to their duration and the debility of the patient, while it is not less indispensable to maintain the bowels in a natural state, actual purging is almost invariably pernicious, unless applied for accidental and specific purposes, of which every physician can judge. The common, the very common effect of it, is to cause relapses or returns of a disorder that has ceased, and thus to render chronic a case that might have terminated; and when what are called courses of purging medicines have been resorted to, whether from any theory of their utility, or from a mistaken view of the symptoms and their cause, it is not unusual to see produced the most inveterate cases of chronic intermittent, and very generally, also, to find them under some anomalous form that might never else have occurred." 460.

Of the truth of these observations we have seen some very curious and melancholy illustrations during the last eighteen months, a period remarkable for the prevalence of intermittent disease under various forms. The same observations, Dr. M. adds, apply to all the cases of neuralgia under its endless modifications. Speaking of the pernicious effects of active purgation, now employed in all disorders, chronic as well as acute, Dr. M. makes the following sarcastic reflection.

"If the united ignorance and presumption of self-empirics could ever find an excuse, they might indeed claim it in this case: when they see practitioners of high fame, if notoriety be fame, following similar universal systems of cure, applying salts or the 'blue-pill' to every disorder or symptom in the nosology, and without inquiry; and thus, while saving themselves all the trouble of thinking, rendering physic an art which may be practised by any one, without previous study or present observation; since the Alkahest does all.

"If it is strong language, it is scarcely exaggerated to say, that this universal tampering with salts and calomel is one of the greatest misfortunes which fashion and folly united ever entailed on England; while it is even matter for satirists, to find that a course of the waters of Cheltenham or Leamington, at once powerful and precarious, a system of active practice which can never be neutral, and which if not useful must be pernicious, is held a fashionable necessity, a mode of passing time, equivalent to any other expensive system of idleness on which society has stamped a certain reputation. But this is a small portion indeed of the evil, when we review the whole of this most extraordinary fashion, in a manner however in which I cannot undertake to examine it here. Whether the old Roman practice of emetics was more or less pernicious than that of the dinner-pills or the morning salts, it is not here my business to inquire; but he is widely mistaken who imagines that the injury produced by frequent or habitual gluttony is to be repaired by the further injury resulting from frequent or habitual purgatives." 464.

Speaking of *physic*—(whether as a *drug*, a science, or a trade, we are not quite certain)—Dr. M. unequivocally accuses it of being the principal *cause* of our diseases!!

"Let any family or any individual thus educated on purgatives, (provided indeed that the health is not utterly ruined,) take but courage enough to destroy the medicine-chest and *lock the door against the physician*, and they will soon find which was the cause and which the consequence." 464.

Dr. M., however, admits that there are some other causes of disease besides physic—for example, malaria, idleness, luxury, peculiar modes of life.

"I must also (says he) notice, as perhaps the greatest and most general cause of nervous affections, particularly in men, *a state of things which seems to have been very much overlooked by those physicians who have speculated on this subject*. I allude to the great increase of mental employment, or of study and business or occupation, requiring mental rather than bodily exertion, connected also with that which frequently becomes a species of disease in itself, EDUCATION, or study and talents, and the latter habitually exerted—added also to confinement and all its collateral evils, and further, too often accompanied by that anxiety, with its occasional attendants or sequels, disappointment, which is the produce of the especial ambition, either as to wealth, or honours, or fame, which denotes the present times." 467.

Still all these are inadequate, Dr. M. thinks, to the production of that wide prevalence of dyspepsia which characterises the present race of English. Purgation, he conceives, is the other grand item in the etiology of bilious, nervous, and dyspeptic disorders.

From what has preceded, we need hardly remark that Dr. M. is a decided enemy to venesection in intermittents, except under the most

rigid restrictions. In the hot fit it is rarely necessary—in the intermission it is dangerous—and, we should imagine that Dr. Mackintosh's practice of bleeding in the *cold stage* must have given our worthy author an ague, considering how very susceptible he is to every morbific impression!

On the other hand, as might be expected, Dr. M. is a steady advocate for good wine and good living generally, in the class of diseases now under review. The partiality, indeed, with which Dr. M. seems to view good cheer, would induce us to believe that he has been so fortunate as to partake of the pleasures of the table, in those situations where the "feast of reason and the flow of soul" add not a little to the enjoyment of the "good creatures" of this world. We are by no means inclined to criticise his dietetics, however, where chronic intermittent diseases are to be managed. Depletion and starvation, in such cases, would be highly deleterious. On what principle, indeed, could we prescribe bark and arsenic, in conjunction with drastic purgatives, venesection, and low diet! The disease is one of debility and irritability—and in these cases, tonics, stimulants, and generous food and drink are called for.

The last subject which we should notice is "change of air," the efficacy of which is undoubted in most chronic diseases, but in malarious diseases particularly. It is not merely the removal from a bad air to a good one that is productive of so much benefit. The operation, in this case, seems to be that of breaking the habit of the disease—as a chronic intermittent appears very often to be a mere habit.

"If this be the case, a difference in the quality of the air breathed, which is what the popular phrase would signify, is not in itself the remedy; though respecting this we really are not in a capacity to argue at present, since it is most certain that the atmosphere, in different states or places, produces effects on the body, of which our present chemistry does not enable us to investigate the causes. The lungs, or the organs here concerned, to whatever extent, are in reality chemical agents superior in discernment or power to those of our laboratories; or the involuntary and unconscious animal is that chemist which the reasoning one is not; carrying on operations which he can neither imitate nor discover, and detecting substances which he cannot find." 492.

Here we must conclude this article—an article which embraces half a volume, and on which we have expended more labour than our readers, or perhaps the author will give us credit for. Nothing but a strong conviction that the work before us contains a multitude of valuable gems, which readers in general will not take the trouble to pick out, could have induced us to bestow so much labour on this review. In rendering Dr. M'Culloch's work more accessible to the profession, by diffusing it in a portable and perusable shape, we are conscious that we are doing the state some service—and the author no injury.

J. J.

XII.—Intermittent Fever of Bengal.

While we find dysentery, scurvy, ague, and several other diseases yielding entirely to the improvements of modern London, it will be satisfactory to know that, through the hitherto gradual and almost imperceptible improvements of our ill-chosen locality, intermittent fever has become a mild and infrequent form of disease in modern Calcutta, among the better classes of Europeans.

I do not know that I could mention any other fact so strongly illustrative of the beneficial effects resulting from local improvements as this particular one, or that offers to the public so strong an inducement to proceed in the same career that has already secured so great an exemption from disease;* for who can look back without horror to the agues of this city,—" the obstinate putrid intermitting fevers," described by the older writers, with their cold stage of " *twelve hours,*" and their long list of sequelæ, in the form of tumid spleen and liver, diarrhœa, dropsy, &c. &c. Dr. Bogue, who practised here in 1757, speaks of this form of fever " as the most fatal " of that time. It began with the rainy season, and continued with excessive violence during the whole of it, and " for some time after." The paroxysm recurred daily, so that " the patients had not above four or five hours respite from it."

Thus, he says, " we had sick at the same time, in this place, one half of the men in the squadron under the command of the Admirals Watson and Pocock." The fevers here mentioned would seem to have possessed the malignant character of the *febres intermittentes algidæ*, described by Torti, in which the power of generating heat was so impaired, that the patient died in the cold stage, at the end of two or three accessions. I have said that ague is an " infrequent " disease in Calcutta, and strangers will read with surprise that, amongst the better classes of society, I do not think I see above three or four cases of this disease in a year, and these occur chiefly amongst parties who go into the neighbouring country on hog-hunting, or other excursions. While writing this note, I am attending a mercantile gentleman, who contracted his illness in the Sunderbunds, where he was exposed during the Doorgah-Poojah holidays, (15th October.) On his return, about the 25th of the month, he experienced a good deal of malaise, and took medicine from his apothecary, with partial relief. Towards the end of October, the native

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* In England, the malignant agues of the olden times seem to have entirely given way to measures of local improvement; *and the most unhealthy seasons in modern times are actually productive of less disease than the most healthy seasons were a hundred years ago*—so much for the value of preventive measures.

servants who accompanied him fell ill of ague, one after another; and on the 20th of November, the master was seized with a violent paroxysm of the same disease.

One circumstance is here worthy of remark, namely, the superior power of resistence to the morbific influence exhibited by the European over Natives, as shewn by the difference in the period of incubation of fever in each; for, in the latter, disease commenced on the tenth and fifteenth day from the date of exposure, while in the European, it took more than thirty days to declare itself openly. It is proper to mention that the European was temperate in habits and inured to the climate. Both the master and servants quitted Calcutta in good health, and neither had been afflicted with ague before going into the Sunderbunds.

Many authors suppose, with Cullen, that in the climate of England, intermittent fever can alone be produced by exposure to marsh exhalations; and a remarkable instance is given in a recent very able memoir by Dr. John Forbes, on the Medical Topography of Land's End in Cornwall, wherein it is shewn, "that neither impure air simply, nor wet, nor the alternations of cold and heat, nor all these combined, can give rise to fevers of this type." I believe this to be true in respect to a *first seizure;* but, *after that,* and when a disposition to relapse is once established, such a combination as Dr. Forbes describes will certainly in most climates (and ours is one of them), prove an efficient cause; and even Cullen admits "the concurrence of other exciting powers," when the miasma is not "strong enough to produce disease." In support of this latter view, I quote a passage, important to all Military Surgeons, from Sir James Macgrigor.

"After the effluvia from marshes or the exhalations raised by a powerful sun acting on a humid or luxuriant soil, we found that in those who were convalescent or lately recovered from agues, the causes next in power to reproduce the disease, were exposure to a shower of rain or wetting the feet, exposure to the direct solar rays, or to cold, with intemperance and irregularity, or great fatigue. Many other causes would excite the disease in the predisposed, but these never failed to do it. In marching troops in a country where this disease is endemic, particularly if they have been lately discharged from hospitals, the above causes should by all means be avoided, since the whole of our experience in the Peninsula shewed, that relapsed cases seldom or never got completely well, in the country in which they were contracted, under all the circumstances of a soldier's life. In making calculations of efficient force, this description of men could not be depended on for operations long continued in the field."

The father of British Military Medicine, Sir John Pringle, writes to much the same effect;—"after the frosts in November the intermittents never appeared, unless upon catching cold, and even then, such only as had been ill of them in Autumn were seized in that manner." The important

observation is continually repeated also by the same great author, as to the excessive liability to attack of those who occupied the lower floors of houses and barracks; and this happened all over Flanders. The influence of splenic disease in producing relapse, or in keeping up the influence of the original agent, is a subject well deserving the attention of the tropical practitioner.

TREATMENT.

With exception to the cases of some delicate females, I do not recollect any that resisted the ordinary management by general or local bloodletting, according to the severity of complication; purgatives and sudorifics, with quinine during the intermissions.

I do not here mean bleeding in the *cold* stage, as recommended by Dr. Mackintosh of Edinburgh, a practice of which my personal experience will not allow me to speak in any favourable terms; neither will a reference to authority prove more encouraging, as the following comparative quotations shew :—

Dr. Mackintosh.

" The practice prevents debility in a direct manner by saving the vital fluid."

Mr. Twining.

" I may say that in all regular intermittents, with cold, hot, and sweating stages, and tolerable uniformity in the hours of accession, the practice of bleeding in the commencement of the cold stage has proved always safe, and generally more successful than any other remedy."

Dr. Mackintosh.

" I believe bleeding in the cold stage, conjoined with the occasional use of sulphate of quinine and laxatives, to be as certain a mode of treating intermittents as any other set of medicines can be said to be certain in the treatment of any other class of diseases."

Dr. Elliotson.

" It is not at all right to take away blood, and thus impare the power of the patient," when, as he adds, he " never saw a case which he could not cure by the sulphate of quinine."

Dr. Stokes.

" Bled in the cold stage, and found it ' useless and injurious, and after all, was compelled to give quinine sooner or later."

Dr. Elliotson.

" The quinine which cures it best, interferes with no other measures."

Dr. Mackintosh.

" The practice may be adopted in the first stage of all fevers."

Mr. Twining.

The recent practice of bleeding in intermittents, as recommended by Dr. J. Mackintosh, not only accords with the acknowledged pathology of that class of fevers ; but seems to bring our system of therapeutics as applied to them, within the limits of those established principles adapted to the treatment of other fevers, from which, formerly, intermittents were almost excluded.

The celebrated Dr. Gregory.

" Bloodletting, which at another period of the disease might have been proper, if employed in the *first stage* never fails to be attended with the most dangerous consequences ; or it is, to use the words of Celsus, ' hominem jugulare.' "

Dr. Copland.

" In a case where I directed bloodletting before reaction supervened, the loss of three or four ounces caused profound and prolonged syncope, yet within four hours, when reaction had come on, fifty ounces were taken before any effect was produced upon the pulse ; and before the sun of the same day had gone down, forty more were abstracted at one time, in all ninety-four ounces, within twelve hours."

Dr. Denmark, Physician to the Fleet, one of the most able advocates for early and decisive bleeding, speaking of the Mediterranean fever, as it prevailed amongst the robust men of the ships' companies, says:—" In these instances, venesection was never had recourse to, till the vascular system had fairly emerged from the depressed state incident to that stage of the fever, and reaction had clearly manifested itself by the returning glow of the skin, the filling of the previously shrunk and dejected features, and the firm though frequently oppressed beat of the pulse.

Former experience not only taught me, that an earlier abstraction of blood was never borne to an extent productive of ultimate benefit ; but on the contrary, seemed to be injurious, by tending to protract the first stage of the paroxysm.

I am afraid that due regard has not been paid to this circumstance, and that, in the recent rage for phlebotomy it has been too much overlooked."

Dr. Mackintosh.

"Bark has been long in use, and although I never denied that it had virtues, yet when given in substance in the large doses which are admitted to be necessary, I have so frequently seen it do mischief that the question has often suggested itself to me, whether it was not more injurious than beneficial? It seems to be injurious in many cases by overloading the stomach and bowels with indigestible ligneous fibre, and I have seen it cause serious intestinal irritation, as displayed by griping pains in the bowels, diarrhœa and painful tenesmus. On examining the stools in these cases they seemed chiefly to consist of bark with a considerable quantity of mucus occasionally tinged with a little blood.

The preparation of bark which is known by name of the sulphate of quinine is the greatest improvement in modern pharmacy, and the knowledge of its beneficial effects in simple intermittents affords sufficient proof of the virtues of the substance from which it is extracted, yet this remedy, all-powerful as it is, is useless in the cold stage, and must also fail in cases complicated with organic disease.* * * My youthful readers may rest assured, that the same observations are generally applicable to the sulphate quinine; yet they

Dr. Stokes.

"Having now described the effects of the practice on the paroxysm, and on the local symptoms, I must next mention some very untoward circumstances which appeared to follow the bleeding in the cold stage—these were *the occurrence of new local inflammatory symptoms, and the supervention of a low irritative fever.*"

Then follows a list of cases the very opposite as to result from Dr. Mackintosh's. "From the examination of these cases, I apprehend that an impression will be received against the indiscriminate or even frequent use of bleeding in the cold stage of ague. It may be remarked that in the great majority quinine had to be administered before the disease was eradicated; that many of them had an extremely slow and dangerous convalescence; that in several instances the disease, so far from being relieved, appeared exasperated by the practice; that local inflammatory affections occurred several times after the operation; and lastly, that the bleeding appears to have a tendency to convert intermittent into continued fever. In one case, that of Casely, death from pneumonia and softening of the brain occurred. In none of my cases did any bad effects from sinking of the powers of life follow the

will meet probably with many practitioners, who will assure them that they have never seen a case in which bark, exhibited in substance, or in any other form, has failed in their hands. When they hear such statements, they may be satisfied that such practitioners never met with a severe case, or that there is some subterfuge.

Some medical men it is but charity to suppose are in the habit of deceiving themselves, &c.

In the instances which fell under my own observation, and to which I have already alluded, fever and violent cerebral symptoms succeeded, and in *two* or *three* instances, local inflammations."

Mr. Twining.

" In the early stages of intermittent fever, or to speak with more precision, within *two or three weeks* of their commencement, in persons of robust habit, there is very often disorder of the functions and secretions of the digestive organs, and particularly of the stomach, co-existent with congestion of the brain, and attended in some cases with *tolerably* distinct evidence of *inflammatory* condition either in the cere-

practice immediately. But I am informed that, in the practice of a highly respectable individual, there occurred two cases in which the patients did not recover from the collapse produced by bleeding in the cold stage. These facts should make us very cautious how we interfere with nature by means of the lancet in simple intermittent, where we have so certain, and as far as I have seen, so infallible a remedy as the sulphate of quinine. I do not deny that cases may often occur where venesection may be proper, such as intermittent complicated with severe internal inflammation; but shall only remark, as these cases have not come under my own immediate observation, that to offer my opinion on a purely practical point connected with them would be wholly useless.

I may mention that I have been informed by my friends Drs. Townsend and Law of this city, that they have given the practice a trial, and have found it to fail in the majority of cases."

Dr. James Johnson.

" What kind of inflammation must that be which explodes, as it were, the moment the clock strikes a particular hour, and vanishes the moment the clock strikes another hour, and this for days and weeks together? What kind of inflammation is that which, every second day, terminates in profuse *perspiration* from head to foot, and yet is renewed after an interval of forty-eight hours with the symptoms as before, and so on? Do

bral membranes *or* in the brain itself."*

* The italics in the two last quotations are mine, and I have added them to shew the remarkable vagueness and want of precision in both writers, when speaking of *inflammation*, whether as affording an explanation of the *physiology* of this disease, as some writers would have it, or as applicable to mere complication.

It is to the former notion that Dr. Johnson's observations apply.

we see real and unequivocal *inflammations* pursue this course? Never. Are the causes of these *intermittent* phlegmasiæ (if such an expression be not a solecism in medical language) of a periodical or intermittent nature? No. They do not accommodate themselves to any particular theory."

Persons accustomed to sift evidence may well stare at declarations such as are here given, and wonder how that which was death in Dublin became a cure in Edinburgh; yet such do we too frequently find medical testimony, and such it has been for two thousand years.

Modern science, however, is steadily though slowly achieving one signal victory—namely, that over exclusive systems, in the treatment of fever especially. It is no longer with us as with the character in Moliere—"A dead man is but a dead man, but rules are every thing."

To conclude:—The rule of practice laid down by Pringle and Cleghorn has received little or no addition in more recent times.

When, therefore, general bloodletting is had recourse to in the treatment of intermittent fever, whether simple or complicated, it should, as in the case of all other fevers, be performed at the very onset of the stage of reaction.

Practised at this period, it will lessen arterial action—relieve venous congestion—usher in the sweating stage—and thereby pave the way for quinine, purgatives and sudorifics, on which the prevention of recurrence must depend.

In feeble habits, or with persons who have resided long in India, local depletion, by leeches, will answer every purpose.

J. R. M.

XIII.—The Congestive Fever of the Cold Season in Bengal.

This fever, like all the diseases of the cold season, is dangerous from its insidiousness. It is a frequent form of disease; and none are exempt from its seizure—not even the prudent of the better classes. It attacks persons of all ages and of both sexes; but men are, from habit of life, far more exposed to it, and that in its graver forms. Its approach, unlike the fevers of the hot season and rains, is very gradual, being commonly but little

noticed either by the patient or friends; or, if noticed, it passes for catarrh, or dyspepsia. At this stage, the functions of circulation and secretion are but little affected; yet, there is a harsh dryness of the skin, especially that covering the abdomen, coupled with a sense of fulness and oppression at the epigastre, which will not fail to attract the notice of the careful physician. In course of a few days, provided these symptoms receive no attention, the circulation and respiration become hurried; headache is present, with great anxiety and lassitude, loss of rest and appetite, the tongue indicating disorder of the digestive function. The loss of more time brings with it serious complication in the form of cerebral and abdominal congestions, as indicated by intense headache, with occasional delirium—increased fulness and oppression of the præcordia—tension of the whole abdomen, coupled occasionally with a yellowness of the whole surface of the body —jaundiced eye, and a surcharged state of the urine:—in short, there are present, all those morbid conditions which we might, a priori, anticipate as arising from neglect under the influences spoken of at pages 43-46, and which cannot be too deeply impressed on the recollection of those who have to encounter the cold season in Bengal; for the same neglect may, according to circumstances, induce the fever here described, dysentery, or the still more dangerous hepatic inflammation common to the cold season.

It is believed that, in animals whose pulmonary system is less perfect, there is a greatly increased quantity of blood transmitted through the liver. In hot climates then, where respiration is less perfectly carried on than in cold ones, owing, according to Tiedmann and Gmelin, to the greater rarefaction of the air, a vicarious decarbonization of the blood is established by an increased flow of bile; and hence it is that the function of the liver, weakened and torpid, in proportion to the excitement of the hot and rainy seasons, becomes disposed to congestion or inflammation of its parenchyma; and thus are produced the dangerous states of disease noticed. An irritable or inflamed state of the mucous digestive surface is also a frequent complication; and these two together constitute the great dangers of our congestive fevers of the cold season, as well as those of the autumnal fevers of the more unhealthy countries of Europe.

The form of fever is generally continued; but when protracted, it may frequently assume the remittent character, particularly where the patient has recently been exposed to the malarious influence, as during the sporting excursions commonly made during the cold season into the districts around Calcutta. The delirium and cerebral torpor are long continued and troublesome, in cases where we have to lament the neglect of early treatment, and these states are accompanied by retention of urine, which must be carefully attended to:—but serious as this cerebral disturbance appears, provided it is not coupled with abdominal complication of a grave nature, I have commonly seen that the patient recovered. When, however, we have the attendants of yellow suffusion, parched and black tongue, jactitation, and a

generally typhous condition, we must perceive that the condition of the sufferer is more precarious.

The appearances on dissection are such as the nature of the disease and its complications might lead us to expect; the lesser degrees of inflammation, or acute congestion, with their results, being very commonly found within the abdominal and cerebral cavities. In neglected cases, we find hepatic abscess, and sometimes ulceration of the mucous digestive surface. This latter state is common to the natives, whom I have continually had to treat at the Native Hospital with neglected fever of from fifteen to twenty-five days' duration; and yet a large proportion of them recovered.

The treatment of this fever is conducted on the same general principles that guide us in those of the other seasons.

We have to diminish arterial action and relieve local congestions, by bloodletting, suited to the urgency of the occasion, the age and sex of the patient. Having effected these primary objects, we proceed without loss of time to loose the secretions, by a full dose of calomel with antimonial powder, followed by brisk saline cathartics. Where no complications exist, one or two moderate bleedings, followed by purgatives and sudorifics will suffice for the cure; but where the brain or liver, or both, are the seats of diseased action, then our remedial means must increase in vigour: the general and local bloodletting must be larger and more frequently repeated; the calomel with antimony, and purgatives, must be more largely and more frequently exhibited, until a relief from fever and local congestion be obtained, with a restoration of natural secretion; for these are the only true signs of recovery. It frequently happens in the course of this fever that, with or without cerebral torpor, we have a sluggish state of the bowels, with defective intestinal secretion. In order to elicit the latter, I was in the habit of combining plain scammony and antimonial powder with the calomel, which was exhibited over night, and followed in the morning by a brisk draught of infusion of senna with simple jalap; or, where viscid mucus impacted the bowels, by a terebinthinate draught. In the fevers of children especially, how often do we see the most alarming cerebral symptoms, with doughy inelastic abdomen, and torpid bowels, at once removed by the night combination I have mentioned, followed in the morning by the rectified oil of turpentine.

Where, on the other hand, we have evidence of irritation of the mucous digestive organs, we must determine freely to the surface by mild diaphoretic doses of antimony or ipecacuanha and the warm bath, relieving the bowels, when necessary, by the most unirritating aperients. Patients were continually brought me to the Native Hospital in the most advanced and neglected state of this fever; with tumid abdomens, confirmed stupor, and tongues black and dry as charcoal; and it is surprising how many of these poor natives recovered under the following plan, which latterly became the settled management in such cases. On admission into the hospital, the

patient was put into a warm bath, and the entire surface of the body purified by the free use of a brush and soap, while the head was shaved and cold continually applied to it. A large sinapism was then applied to the abdomen, and where the state of the pulse permitted it, a few leeches were applied to the epigastre, or behind the ears, or both, followed, in a day or two, by blisters to those parts. An aperient draught was always administered on admission, aiding its operation by enemata.

A course was then commenced of about a scruple of the sesquicarbonate of soda, five of powdered rhubarb, and one of ipecacuanha. This combination was exhibited three or four times in the 24 hours; while the diet consisted only of iced barley water; and, as I have said, the result, from such simple measures, was such as to surprise many who witnessed the progressive recovery of sense, and gradual restoration to health, of persons who, but a week before, had appeared in a state of hopeless disease.

They were generally cases in which fever had gone on unrestrained for fifteen to twenty days, and in which consequently the period for more active measures had long passed away. We were therefore content to work guardedly with nature—to see the patients improving—as any attempt to hasten the operation of cure would only have endangered their safety—so reduced were the powers of life.

To conclude—it is scarcely necessary to state, that where this fever assumes a remittent character, quinine in moderate doses, and exhibited during the periods of interval, will be found of signal advantage.

J. R. M.

XIV.—The Ardent Fever of the Hot Season in Bengal.

I have placed this fever last in order, because, though very dangerous in the case of hard-drinking soldiers especially, it is yet by no means so frequent as any of the other forms of fever previously noticed. A consideration of what has been said on the general influences of a high range of temperature, at pages 37 and 38, will have prepared the reader for an unusually severe and dangerous disturbance of the vascular and nervous functions, under the united influences of direct solar exposure and intemperance; and so we find it in the soldier. While lately examining the returns at the Director General's Office, to which the kindness of Sir James Macgrigor has given me access, the clerk who assisted me in the examination, exclaimed—"*here, Sir, are twenty-one admissions from apoplexy into hospital at Berhampore in one season, and twenty-one deaths:*"—they were, in fact, cases of the most violent cerebral fever, amounting, in some instances, to actual coup-de-soleil. "Where the line was to be drawn," says Dr. Henderson, "between apoplexy and remittent fever, is hard to say."

The history of these cases, as given by Drs. Monat and Henderson, the

able and experienced surgeons then of Her Majesty's 13th Light Infantry, will give a correct idea of this fever, in its worst form.

The soldiers consisted of older men who had recently returned from *the Rangoon war*, and recruits. The corps was marched cruelly, because unnecessarily, during the hot season from Nuddea to Berhampore—a distance of sixty miles. The younger soldiers had been previously drilled in the sun thrice a day, so as to greatly injure their healths before quitting Calcutta:—in short, both classes were in but indifferent health on commencing this unfortunate march; and though it was conducted *during the night*, with every care which medical precaution could dictate, the effects were fatal to a remarkable degree. "*None of the natives were taken ill during the trip.*" Such of the Europeans as could not reach the camp by 9 A. M. "were seen to drop down and instantly expire: others less severely attacked were saved by timely and copious bleeding." Presently Dr. Henderson, the officer in charge, became seriously ill; and the day closed with a sick list of sixty-three, and eighteen deaths, out of the right wing of the regiment alone. Both the sickness and the deaths were chiefly confined to the recruits. The symptoms, as described by Dr. Henderson, were:—flushed and swollen face, amounting sometimes to lividness—a parched and burning skin—a full and frequent pulse—difficult and oppressed breathing—giddiness and sense of fulness in the head, amounting to acute pain in some cases, with burning heat of the eyes, succeeded by loss of sense and motion and faltering of the tongue—dilated pupils—twitching of the muscles of the face—subsultus tendinum, and involuntary evacuations: there was no stertor, or paralysis; the symptoms could be referred to a violent excitement of the vascular and nervous systems, with congestion in the cerebral vessels, produced by excessive heat acting on the irritable frame of the dissipated and unseasoned European soldier.

Such is the severer form of ardent fever peculiar to the hot season in Bengal; and from an interesting report of Dr. Milligan's of the 63d Foot, we find that like symptoms resulted from exposure of the corps at a funeral ceremony in Madras.—"The greater number of the men were in the prime of life; but there were amongst them some old soldiers who had served 20 years and upwards, some of it in the West Indies, and were much broken down by service and intemperate habits." The entire corps had just arrived from the Australian colonies, "where spirituous liquors can be obtained on easy terms." These were landed in the month of May; and from the date of the "untoward circumstance" of the funeral chiefly, "the hospital became filled with cases of fever." Two men dropped down and died on the very day of the funeral, and for several days the fever cases augmented considerably.—"I have reason to believe that the effects of this exposure to the rays of a vertical sun did not rest here, but laid the foundation of future mischief, in assisting to originate fever, hepatitis, and dysentery, from which the regiment afterwards suffered much.

Examination of the bodies after death was unfortunately impracticable in both the instances cited, as the sickness of some of the medical officers, and the harassing duties imposed on all, left no time for the usual investigation.

In the Bengal instance, Drs. Monat and Henderson directed frequent bathing of the head and hands, as precautionary means, the march being conducted slowly, and the troops halted every hour: on these occasions, the men were urged to refrain as much as possible from drinking water.

When actual disease occurred, with " sinking of the vital powers, or a kind of collapse, a grain of opium was given to produce re-action, after the occurrence of which they were largely bled; and, with these precautions, though thirty men were admitted into hospital the first march, none died."

In all, sixty-three men of Dr. Monat's detachment were taken ill during the march, fifty of whom were recruits. The disease, he says, " was a remittent fever of the severest kind." In 1828, being two years after the above incident, Dr. Monat describes a " cerebral disease arising from exposure to fatigue under the influence of high temperature." In this latter instance, bloodletting to the amount of fifty, sixty, and even a hundred ounces was had recourse to; but the " remedy sometimes was worse than the disease; for though the first attack might be relieved, yet the subsequent symptoms required the same profuse evacuation for their relief; and from the previous loss of blood the patient was not in a state to bear such depletion. In fact, two individuals became convulsed, and shortly after they were bled, died; and after death it was found that, though the heart was empty, the vessels of the head were loaded with blood."

Cold affusion, often repeated, and continued cold to the head were then premised; and after being put to bed, when re-action took place, the soldier was bled to thirty or forty ounces, followed by full doses of calomel, purgatives, and leeches to the head.

To the reports above quoted, we have, in the second volume of Mr. Roger's Madras Medical Journal, appended a series of important observations by the present distinguished Inspector-General of Her Majesty's Hospitals in India, Dr. Murray.

Dr. Murray " apprehends that there is an essential pathological difference between the morbid affections arising from exposure of the *bare head* to the direct rays of the sun, or from over-exertion under great heat, and such as are induced by the influence of a high temperature *in the shade*. In the former case, strong excitement is at once produced in the organ affected, by the direct stimulus of the cause. Thus, in the case of exposure of the bare head to the sun, the scalp being protected by the hair, and peculiarly constructed, does not blister as the skin of other parts of the body would do, if exposed to a strong solar influence; but its temperature becomes exalted, and the caloric, traversing through it and the skull, gives

immediate rise to active hyperæmia, and inflammation of the contents of the cranium. In the latter case, the application of the morbific agent being upon the general system, the cerebral affection which results, appears to be induced in a different manner—at first there is nervous depression or collapse, and sanguineous congestion; upon which re-action follows." Then follow remarks of great value on the seat, symptoms, predisposing causes, diagnosis, necroscopy, cure and prevention of this formidable disease; and it is with much regret I find my limits will not here allow of my presenting more than the bare summary of treatment. "The remedial means chiefly consist in *bloodletting, general and local —cold applications to the shaved head—cathartics—clysters—antimonials —mercurials—counter-irritants—cordials—darkness—rest—quiet and abstinence.*"

Dr. Murray urges that, except in cases of extreme necessity, the patient be not subjected to coercion, such as that of the strait-waistcoat, as the cerebral excitement will thereby be increased by the efforts at release. All articles of clothing capable of obstructing circulation in any part of the body, more especially about the neck, to be removed, the posture to be such as to favor the free return of blood from the head.

Under the severe exposure and fatigue of the Bengal detachments marching to Berhampore, it was remarked that, while the Europeans suffered so fatally, "*none of the natives were taken ill;*" and such I dare say will generally be the case.

I recollect, however, an instance where it proved the reverse of this, in the Governor-General's Body Guard—a select corps of cavalry—with which I served during the Burmese war. We mounted at 11, A. M. on the 12th of May, and, with one short halt only, we made a forced march of forty miles. The heat oppressed us almost beyond endurance; and many of the most powerful of the native troopers fell off their horses vomiting, convulsed, cold, and bathed in clammy sweat. Where a tree could be found, they were placed under its shade and dashed with cold water. We pushed on, and thus left several behind; *but not one European, whether commissioned or non-commissioned, fell sick either during the march or after it:* but we were all healthy, young, temperate in our habits, and *well-seasoned,* and such men, it is well known, will bear, with comparative impunity, fatigue and exposure almost beyond belief. In short, as stated in the article on climate, it is the ill habits of the European soldiery that gives such fearfully active power to tropical heat, and but for these habits its influence would be but comparatively small. In the two wings of the 13th Light Infantry for instance, we hear of no officer, except Dr. Henderson, as having even fallen sick.

But it is time I should say a few words on the fever of the hot season as it appears in civil life, and amongst persons of the better classes of society in Bengal. The type of this fever is usually continued, but some-

times remittent. It seizes with suddenness and violence, the heat, thirst, frequency of pulse, and racking headache coming in rapid succession. The complications are usually cerebral, with occasionally severe form of gastric disturbance, as indicated by pain, oppression of the præcordia, and vomiting: sometimes the liver is involved. We have not here the tendency to collapse so characteristic of the true Bengal remittent fever, but the rapid progress of the disease with the cerebro-spinal and gastric complications, constitute the ardent fever of the hot season one of considerable danger.

The appearances on dissection are such as might be anticipated from the symptoms during life. They consist of inflammatory or congestive states of the cerebro-spinal organs; and where the liver, stomach, and lesser bowels have been implicated, we have the morbid appearances common to most of our fevers. Serous effusions are common to most of the cavities. The treatment consists of active bloodletting to the extent of allaying the vascular disturbance—cold affusion, and continued cold to the shaved head—brisk purging followed by calomel and antimony, until the secretions are rendered healthy, and relief is obtained. In this fever, as well as in that of the cold season, the skin is harsh to the touch, compacted, hot and dry, so as to admit of a more free use of antimonials and diaphoretics than we find requisite in the fever of the rains. Where remission takes place, provided the head be relieved, quinine must be had recourse to for the purpose of preventing recurrences; and, should symptoms of exhausted nervous power, or of delirium tremens, make their appearance, half a grain to a grain of opium, united to the calomel and antimony, will soothe and procure sleep. It is in this fever that cold affusion exerts its greatest power in abstracting heat, and subduing vascular and nervous excitement. I remember the case of an officer who had been much exposed to the direct rays of the sun, and who was brought to me on the seventh day of his illness. His sufferings and distress were beyond description; and, excepting an intense heat, all the powers of life were sinking rapidly. His reduced state rendered bloodletting out of question; so that cold affusion appeared to offer the only remaining chance of saving him: I therefore had large quantities of cold water dashed over the head and body. The relief was more surprising than any I have ever witnessed in the treatment of disease; and this officer, to all appearance lost, was, through this and the other means above-mentioned, speedily restored to health.

J. R. M.

XV.—Endemic of Batavia.

The following Account of the Batavian Endemic was written by Mr. W. Shields, a Surgeon in the Royal Navy.

In the month of June, 1800, His Majesty's ships Centurion, Dædalus, La Sybille, and Braave, having on board a detachment of the 12th regiment, consisting of 127 men and officers, sailed from Madras, on a secret expedition; and on the 23rd of August following, the squadron anchored in Batavia Roads. The Centurion and Dædalus were placed about four miles from the garrison, to blockade the port; the Sybille kept constantly shifting about, to interrupt the approach of small vessels to the city; and the Braave lay at anchor under the small island of Onrust, about three miles from the main land of Java.

During the first few weeks, the squadron continued tolerably healthy, and without any deaths; although the crews were much harassed by night and by day, in chasing the enemy's vessels, rowing guard, and loading or unloading the prizes off the island of Onrust.* The weather was pretty temperate at this time; the thermometer, in the shade, generally ranging from 82° to 87°, with regular sea and land breezes. When the latter, however, came off from the low, swampy grounds about Batavia, early in the mornings, it brought with it a thick mist, accompanied by a very fetid smell, all of which would gradually go off as the sun rose and the sea-breeze set in. During the prevalence of this fetid mist in the morning, many people would complain of slight indisposition in the head and stomach, which likewise went off as the sun came out.

About this time the Braave disembarked an officer and some men of the 12th regiment, on duty at the island of Onrust, where a temporary hospital was established; and here the first appearance of *endemic* fever was observed. It was not, however, in any alarming degree, but chiefly confined to those who lived intemperately; as none of the officers of that ship were attacked though they frequently slept on shore. Some of the people having broken open a spirit-store on the island, were in the habit of getting intoxicated, in which state they often exposed themselves to the intense heat of the sun, by day, and the damp, cold dews of the night. A few of the 12th regiment fell victims to fever, much aggravated, if not occasioned by irregularity; in consequence of which, an idea was very generally propagated, that the island was peculiarly unhealthy.

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* Contrast this with what happened to the crews of the Russel, Albion, and Powerful, at the same place, in 1806, when their sanguine hopes of surprising the Dutch squadron were suddenly dissipated.

On the 14th September, the Centurion relieved the Braave, and took charge of the hospital, where twelve cases were left behind, most of them very ill, and some of whom died. Prepossessed against the island, the Surgeon of the Centurion declined landing any of his sick there, at first; till, finding that some of the Braave's, who were exceedingly ill, recovered, and that none of the nurses were attacked at the hospital, he ventured to land six of his worst patients (bilious remittents and fluxes), who all did well. He, therefore, became convinced, that the reported insalubrity of the island was unfounded, in a great measure, at least.

Unfortunately, however, the commanding officer of the expedition, conceiving that the vicinity of the island to the main land was the cause of sickness (which supposition seemed corroborated by the fetid mists that daily came off from thence to the island), ordered the sick to be removed, on the 28th September, to the small island of Edam, situated nine miles out to sea; a circumstance that he thought must ensure its salubrity. Here the tragic tale commences;—but first let us glance at the medical topography of the two islands. Onrust is a small island, three miles from the main, well cleared of trees, underwood, and jungle; nearly flat, and free from swamps or marshes, except one very small spot, which, however, is daily covered twice by the tides.—On this island there were many excellent buildings, where the convalescents could be separated from the fever cases, and where all could have abundance of space and ventilation. From the fetid exhalations which were conveyed by the land-winds from the neighbourhood of Batavia, the sick were easily secured, by closing certain apertures in their apartment, till the sun dispersed the vapours in the morning; after which, there did not appear to be any danger from the miasmata disengaged during the day. Edam, on the other hand, though farther out of the reach of Batavian exhalations, is covered with trees, long grass, and jungle, having a part of the island itself in a stagnant, marshy state. The buildings here were indifferent, and only one long ward could be found, for the sick and convalescents; in consequence of which, the latter class of patients experienced all those dire effects produced by the depressing passions, for ever nurtured by the melancholy scenes of death, which this fatal spot too constantly presented to their view! Thus, in running from a doubtful danger, they precipitated themselves on certain destruction. In leaving Onrust (a cleared space), to avoid the effluvium of Batavia, weakened and diluted by a three miles passage from its source, they settled on the jungly and marshy island of Edam, where pestilent miasmata, in a concentrated form, issued from every foot of ground around them!—The fatal effects which followed, were predicted by an eminent surgeon on the spot, but his suggestions were disregarded or overruled; *distance* from the main being held paramount to all other considerations.

Of sixty soldiers (12th Regiment), landed at different times, *in health*, to do duty at Edam hospital, and other buildings on the Island, between the

1st October and 12th November, thirty-one died (besides five or six at Onrust, previously.) Of the remaining twenty-nine, embarked on breaking up the blockade (12th November), twenty-two died at sea; the other seven were sent to Malacca hospital, where all, or nearly all of them, shared the same fate!—In short, only sixty-two returned out of the whole detachment; the rest having fallen ingloriously, without drawing a sword!

All the soldiers getting ill on Edam, sixteen marines were landed from the Centurion, to do night duty, as they expected an attack from the Dutch gun-boats. The whole of these were seized with the fever, and thirteen died; two recovered, and one was sent to Malacca Hospital.

The loss of seamen I have not been able exactly to ascertain; but it must have been considerable. Almost the whole of the sick (twenty-eight in number,) who were removed from Onrust to Edam (28th September,) died. And as nine officers, including the surgeon, Mr. Cornish, who were doing duty at this dreadful Island, perished, we may form some idea of the general mortality.

It is worthy of remark, that the Dædalus, in which 25 of the detachment from the 12th Regiment were embarked, did not land a man on any of the islands, nor did one of her men die, or suffer an attack of this endemic. Such is the outline of its history; the following are the features of this fever, principally as it appeared at Edam, its head-quarters:—

The patient, without much previous notice (of the first attack), is suddenly seized with giddiness and cold chills—sense of debility, and vomiting, with pain over the orbits, and in the epigastric region. He frequently falls down, and is insensible during the paroxysm; his body covered with cold, clammy sweats, *except at the pit of the stomach, which always feels hot to the palm of the hand*—the pulse is small and quick. On recovering a little, this train of symptoms is succeeded by flushings of heat—increased pain over the orbits, and in the sinciput—pain and a sense of internal heat about the stomach and præcordia—oppressed breathing—the lower extremities, at this time, not unfrequently covered with cold sweats. The eyes now become, as it were, protruded, and the countenance flushed. Retching, and at length, vomiting of discoloured, bilious matter, come on—the tongue white and furred—the abdomen tense and full, with pain in the loins and lower extremities. The length of this paroxysm varied from six to eighteen hours, and was generally succeeded by cold rigors—very often low delirium, preparatory to the next stage or paroxysm of the fever. The intellectual functions now become much impaired, the patient not being at all sensible of his situation, or of any particular ailment.—If asked, how he is? he commonly answers, "Very well;" and seems surprised at the question. This was a very dangerous symptom, few recovering in whom it appeared. In this stage all the symptoms become gradually, often rapidly aggravated; particularly, the headache—pain and tension in the epigastric region, and vomiting. Some patients, *on shore*, were carried off in 18, 24, 30, or 40

hours, and others not till as many days after the attack, especially when removed on board, from the more noxious air of the island. A great proportion changed, in a few days, to a bright yellow; some to a leaden colour: other cases terminated fatally, in a very rapid manner, too, without the slightest alteration in that respect. Generally, however, the change of colour indicated great danger. Vomiting of black bilious stuff, resembling the grounds of coffee, frequently commenced early, and continued a most distressing symptom; too often baffling all our attempts to relieve it. In some, a purging of vitiated bile, or matter resembling that which was vomited, occurred; in a great many, a torpor prevailed throughout the intestinal canal—rarely did any natural fæces appear spontaneously.—The pupil of the eye was often dilated, and would not contract, on exposure to a strong light—in others, there was great intolerance of light:—both indicated danger. Low delirium was a pretty constant attendant on this fever, from first to last; sometimes, though more rarely, raging high delirium. Mr. Carter's was an instance of the latter, which he had in a very terrible degree, with red, inflamed, and protruded eyes—great inquietude—hot, dry skin—small, quick pulse; his mind actively employed about the stores and prizes on shore, of which he had charge previous to his illness. During the violence of the paroxysms, he was quite insensible to every thing that was going on around him, constantly grasping at, or wrenching those objects within his reach. He made frequent attempts to get overboard. In the low delirium, also, the mind is much occupied on avocational subjects: if a seaman, about the ship's duty; if a soldier, about his regiment, marching, &c. Some patients were comatose from the first attack; in others, the fever was ushered in with convulsions, delirium, and cold sweats, without any intervening heat of the surface, except at the pit of the stomach, which, in most cases, was burning hot to the touch and accompanied internally by a similar sensation according to the patient's own feelings.

Hæmorrhage from the mouth or nose seldom occurred; in two cases, which terminated fatally, the blood did not coagulate, but tinged the linen yellow. Aphthæ appeared in a few cases, and indicated danger. Subsultus tendinum often attended both on the low and high delirium. The pulse never could be depended on. In the very last stage it has been regular; but in general it is small, quick, and either hard or stringy and tremulous: sometimes, during the re-action of the system, full and hard. Deafness was very common, and an unfavourable symptom. Two kinds of eruption appeared about the lips—one such as we often see at a decline of common fevers; the other consisted of small black or brown spots round the lips, and was likewise a dangerous, indeed a fatal symptom. With this eruption, the teeth, tongue, and fauces generally become covered with a brown or black crust, and the breath intolerably fetid. Locked-jaw took place in two cases at Onrust Hospital, but the patients were insensible of it:—both

died. *The brain appeared the organ chiefly affected at first—the stomach and liver in succession.** In those cases which occurred on board, and where the patient had not *slept* on shore at Edam, the symptoms were much milder, and the fever resembled more the bilious remittent of other parts of the East. A great torpor prevails generally throughout the system, with the low delirium; blisters, medicines, &c. having little effect on the patient, who appears as if intoxicated. When roused, he recollects the person who is speaking to him, for a moment, and answers in a hurried, incoherent manner; then lies on his back, his mouth and eyes half open; both fæces and urine often passing involuntarily. I have seen them remain in this state for hours—nay, for days together, scarcely moving a single voluntary muscle all that time. In this melancholy situation, Lieut. Neville, of the 12th Regiment, lay for some days previous to his death.—Never was there a disease so deceitful as this fever: I have frequently seen instances where every symptom was so favourable, that I could have almost pronounced my patient out of danger; when all at once he would be seized with restlessness—black vomiting—delirium—and convulsions—which, in a few hours, would hurry him out of existence!

This was the case with Mr. Broughton, Purser of the Dædalus, who died of the Batavian endemic at Edam Hospital. On the seventh day of his illness he took a change for the better; and everything was promising. The morning before he died, he expressed himself greatly relieved; and called for some mutton broth and sago, both of which he ate with a good appetite;† spoke rationally—and was in good spirits. Towards evening the delusion vanished—restlessness—black vomiting—delirium and convulsions supervened, and carried him off before morning! I have seen many cases terminate in this manner. Two patients at Edam complained of a diminished size of the brain, and that they felt as if they could shake it about within the cranium:—both died. Mr. Cornish, Surgeon of the Dædalus, who had charge, for a while, of the hospital, was one; he died on the seventh day of his illness.

The fatal terminations generally happened on the third—fifth—seventh—ninth—and not unfrequently the eleventh and thirteenth day; if they passed this period, they usually lingered out twenty or thirty days. But very few indeed ever ultimately recovered, who had slept on shore, and were attacked at that dreadful island, Edam! No constitution was exempted from the assault of this fever. It seized with equal, or nearly equal violence, on those who had been many years in India, and on the most robust and plethoric, or newly arrived European. Even the Dutch officers and Malays, who had been drawn from different parts of Java, and whom we

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* This accords with my observations on the Bengal Endemic, and with the mode in which I supposed miasmata to act on the human body.

† Hunger is a fatal symptom in the yellow fever.

had prisoners at Edam, fell victims as fast, or nearly so, as the English. Several officers, seamen, and soldiers, were sent on board from this island, in hopes that the change of air might mitigate the disease. Many of even the worst cases of these would promise fair for a few hours in the forenoon; but night always dispelled our hopes, for then the patient relapsed as bad as ever;—they almost all died. But their fate was considerably procrastinated by the change; many of them lingering out a great length of time on board, sinking at last from the consequences of the fever, rather than from the fever itself. Several of them changed into obstinate intermittents at sea, with great derangement of the liver, spleen, and bowels. Indeed the liver, in most cases, seemed affected from first to last in this fever; but in all protracted states of it, this affection became the prominent symptom. In those that were cut off during the first 18, 24, or 30 hours, the brain appeared to be the organ oppressed. With respect to the question, whether or not this fever was contagious, I am decidedly of opinion that it was not so. For if all the nurses and medical attendants of the hospital at Edam died, it must be remembered, that they were equally exposed to the cause of fever, whatever it is, as the soldiers and seamen who did duty at the barracks and other buildings, or who were sent to the hospital for other complaints; all, or nearly all of whom shared the same fate. Moreover, what I conceive decides the question is this; that although, on our raising the blockade of Batavia, great numbers of sick, in every stage of the fever, were brought on board from the hospital at Edam, yet not a single nurse, or medical attendant of any description, ever suffered the slightest attack of fever; nor did any circumstance transpire, that could in the least favour the idea of contagion, notwithstanding that the great accumulation of sick on both decks rendered it a matter of impossibility to separate them completely from those who were well, nor at all times to prevent a considerable generation of effluvia.

From our first arrival at Batavia, in August, until our return to Malacca, in January following, we only buried one man of fever, who had *not slept on shore at Edam, Cuypers, or Onrust islands; whereas almost every person who slept even a single night at Edam died.* No ill effects were experienced from going on shore in the day time, or among the sick at the hospital. I myself regularly visited the hospital of Edam, every day, with perfect impunity, till one night that I stayed rather late, attending the unfortunate surgeon of the Dædalus; in consequence of which I was three days afterwards seized with the fever, but recovered by mercury, carried to ptyalism. I think it highly probable, however, that had I slept on shore, no medicine would have saved my life.

The night before we raised the blockade, parties of men and officers were sent on shore at Edam to blow up and destroy the works and buildings on the island, which operations detained them about half the night there. Most of these were shortly afterwards attacked with the fever, but

all recovered except one (Mr. Parry, midshipman); his fever, too, was checked by mercury; but, being of a diseased habit, he relapsed when the soreness left his mouth, and died. The gunner, carpenter, and other officers, were all seized with the fever; but the former, being principally employed among fires, in laying trains, blowing up, &c. had the disease in an infinitely milder degree than any of the others.

One circumstance more is so singular in itself, and so much attracted our notice at the time, that I think it deserves commemoration. *Of all the people or patients who slept at the fatal island of Edam, four only, to the best of my knowledge, escaped the fever entirely, and returned to Malacca.—These were two obstinate venereals, and two chronic dysenterics; all under the influence of mercury for some time before I sent them to the hospital. Their complaints did not get better in the least on shore, so that they continued to take mercury there. They slept in the same ward with the fever patients all the time, but never had the slightest symptom of fever themselves.* One other patient at the hospital did not catch the fever, but he was sent there in the last stage of phthisis, and died in a few days after he landed.

I have omitted to mention, that despondency, or anxious timidity, very frequently accompanied the access of this fever; while a placid resignation to their fate, or rather an insensibility to their situation, marked its fatal close.

TREATMENT.

In this, as well as in the common fevers of India, says Mr. Shields, where a redundancy of vitiated bile might be suspected, lurking in the primæ viæ, I have always prescribed a solution of salts and emetic tartar, as the first medicine, which generally operated both upwards and downwards; and subsequently, by perspiration, in a short space of time, to the great relief of the patient. On the same evening, an anodyne antimonial draught (vin. ant. one drachm, tinct. opii, gut. xv. vel xx., aq. menth. two ounces) was exhibited, to allay the irritability of the stomach, promote the cuticular discharge, and dispose to sleep. Bleeding I was afraid to attempt, as in the *only case*, to my knowledge, where it was tried in this fever, the patient very soon afterwards died, in a state of putrescence. *From this circumstance, and from some accounts which I had read, of its bad effects in fevers of the West Indies, I gave up all idea of the lancet.** I, therefore, had recourse to evacuations from the bowels and from the skin. For the latter purpose I tried various

* Unfortunate resolution! many men were consigned to the tomb during this awful visitation, from want of depletion. But at that period it was sacrilege to bleed in the fevers of the East. A more auspicious light has dawned on Indian therapeutics.

medicines, such as the saline draughts, with sp. æther, nitros., tepid bathing, with diluents, &c.; but I found none equal to small doses of antimonial wine and tincture of opium, given frequently, with plenty of warm diluent drinks, and occasional pediluvium. By perseverance in this plan for a few days, *in the less violent cases*, the skin has become relaxed, with an equally diffused perspiration—the pulse soft and natural;—the pains and delirium have disappeared; and nothing but debility remained, which was soon removed by bitters, bark, wine, and nourishment.

But, alas! in the more concentrated forms of the disease, by which we were now surrounded, this practice was far from successful. *For here the patient hourly lost ground; and seemed to be hurried out of existence by the local effects of the fever; chiefly confined to the brain and liver. What the nature of these local effects was, I am unable to say. They appeared to be either inflammation—an accumulation—or a greater determination of blood to those organs, or perhaps something compounded of all these; and evinced by the red, inflamed state of the eyes—the delirium—the oppression, tension, and often pain, in the epigastric and hypochondriac regions.** Finding, then, that bleeding would be attended with fatal consequences, and that antiphlogistics and tonics were alike ineffectual, I was forced to have recourse to other means; and knowing that mercury was a powerful specific against local inflammation, particularly of the liver, as well as a most valuable medicine in bilious remittents, where visceral obstructions were forming, or formed, I placed my last hopes in the employment of this active remedy. I generally prescribed calomel, combined with opium and antimonial powder, in some few cases, with camphor, in the following manner:—

Calomel, six or eight grains;
Antimonial powder, two grains;
Opium, one grain.

These were made into a bolus, and taken every three, four, or six hours; so that from twenty-four to thirty-six grains of calomel might be taken in the course of the day and night.—If a salivation could be excited in a few days, the patient experienced an immediate change. The fever entirely left him—the pains abated—the intellectual functions were restored—the stools became natural, and nothing but tonics, nourishing diet, and change of air, were wanting to perfect the recovery. This last desideratum (change of air), the most important of all to convalescents, was least of all within our power, while we inhaled the noxious atmosphere of Batavia.

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* I need hardly remark, that these conclusions, the result of observations made at the bedside of fever, and in an extensive field, form a striking coincidence, and a corroboration of the theory of fever which I framed in the same school of experience.

Here, then, we had the mortification to see our patients, after being rescued from the jaws of death—every symptom of fever gone, and after being several days convalescent, with a relish for food—relapse one after the other, *as the soreness left their mouths,* and die almost to a man!

Many instances, however, occurred at Edam Hospital, where mercury was prescribed in large quantities, *after other medicines had failed in the beginning,* without affecting their mouths; in which case they all proved fatal. I have sometimes prescribed bark and wine, in conjunction with mercury, to support the system during its exhibition, and I think that in several instances it accelerated the ptyalism.* Blisters often gave temporary relief to local symptoms, such as pain—hepatic affection, and vomiting. They likewise served as stimuli, to rouse the patient from stupor and delirium.

In the early stage of this fever, the tepid bath was used with advantage; but in advanced states of the disease, I think it did injury, by increasing debility. I have frequently experienced the greatest benefit from sponging the body with cold vinegar and water, where there was low delirium—cold, clammy sweats—and stupor. In such cases, the pulse, from being 120 or 130, would fall to 90, and a refreshing sleep succeed; —but night always brought on the usual exacerbation. Gentle emetics of ipecacuanha, I have often found to relieve the delirium, oppressed breathing, and load at the stomach or præcordia, even at an advanced period of the disease. *In cases where great determination to the brain appeared, I have often given brisk doses of calomel and jalap, with surprising good effect. Indeed, evacuating medicines, of every kind, where they do not tend to debilitate the system, are extremely useful in the early stages of this fever.* Wine, porter, and nourishment, did more harm than good, except in the advanced periods of the disease, when porter was always beneficial in checking the vomiting, and allaying the irritability of the stomach. Bark, in many cases, did much harm, by bringing on or increasing the vomiting, and other dangerous symptoms—besides checking the perspiration, and rendering the patient hot and restless. In some cases, however, I think it produced good effects, especially when guarded with opium, to make it sit on the stomach.

But could the patient be removed from the noxious air of Batavia into a purer atmosphere during the mercurial course, I should not have a doubt in the efficacy of mercury; for it was the only medicine that ever bade fair to check the ravages of this dreadful fever. Without this change of air, I believe that every human means will have but a temporary effect; and, excepting mercury, few of them will have even that.

It is necessary to say, that copious ptyalism must be brought on, other-

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* This is similar to Dr. Balfour's plan.

wise it will prove inefficient. I tried the nitrous acid, as recommended by Dr. Scott of Bombay, but cannot say any thing in its favour. The Dutch medical practice at Batavia consists in giving camphor in weak julep; making the patient drink quarts of it in the course of the day, till the perspiration teems from every pore in his body; keeping him all this time in a close room, well covered over with warm bed-clothes, and without paying the least attention to any urgent symptom, or other means of arresting the fever. But this plan was very unsuccessful; for the mortality in the garrison of Batavia, while we lay before it, was dreadful, particularly among the European soldiers.

Previous to our appearance, the Dutch, in general, resided a few miles up the country, on elevated ground, and out of the reach of those pestilential vapours that issue from the low swamps in the vicinity of the city. There they enjoyed tolerable good health; but our arrival forced them into the garrison, where they had hard duty, day and night, in keeping a look-out upon us, and throwing up works to defend the place. The fever, therefore, swept them off in prodigious numbers, so that their loss far exceeded ours. In an action with some of their gun-boats, we had a few men wounded, who did well on board. But this seems to be a rare circumstance; for one of our officers being on shore with a flag of truce, was asked by the Governor how our wounds succeeded; and, being informed that they were all nearly well, he seemed quite astonished, and would hardly give credit to the account; declaring, upon his honour, that during fifty years which he had passed at Batavia, he never knew a single instance of a man surviving a wound received in the noxious air of the city and its neighbourhood.* He also expressed great surprise, that our mortality in the squadron was not greater; as he calculated on our losing at least half our men during our long stay there. The Dutch ships generally lost from half to three-fourths of their crews, between their arrival at Batavia and their departure for Europe.

XVI.—Dysentery.

There is hardly a disease in the whole range of nosology, regarding which so great a discrepancy among authors and practitioners has existed as in dysentery; and this must have originated, I conceive, in consequence of mistaking prominent *effects* for proximate *causes*: and as the means of cure directed against the former have often removed the latter, each indi-

* This corroborates the circumstance mentioned by Lind, of the slightest scratches turning into dreadful ulcers, on board the Panther and Medway, in 1764.

vidual believed that he alone had found out the true cause and cure of the disease. Thus, one physician examining the body of a patient who died in a certain stage of dysentery, and, finding many traces of inflammation, or even sphacelus, in different parts of the intestines, without any strictures, frames his inflammatory hypothesis; and, although he employs, as *auxiliaries*, some of the means recommended by others, he makes venæsection the *principal* indication—has tolerable success, and becomes quite satisfied that he has hit on the proper plan. Another patient dies at a less advanced period of the disease, or where mortification has not relaxed and effaced all signs of stricture. He is examined by a different physician, who finds the inner coat of certain parts of the intestines corrugated, thickened, and the canal reduced to a very small diameter, with fæcal remains lurking in the cells of the colon, or flexures of the small intestines, situated above these strictures. Establishing a doctrine on this, bleeding is only had recourse to occasionally; and certain medicines, supposed to have the power of relaxing these spasms or strictures, are exhibited, with frequent laxatives, and success is often the result.

A third person, in examining the bodies of dysenteric patients after death, in hot climates, finds abscess, or other organic derangement of the liver, an appearance very common; and concludes that dysentery is hepatitis in disguise. He prescribes mercury, and his success is still greater than that of others; consequently he is *positive* that he alone pursues the true course, and entertains just ideas of the disease.

A fourth, observing that dysentery is always accompanied with defective perspiration, and taking up the idea of Sydenham, that it is a fever turned in on the intestines, has recourse to sudorifics, and not without considerable success; so that he pities the blindness of those who cannot see that the disease is merely "the perspiration thrown on the bowels." How are we to reconcile these jarring opinions and practices? In adhering obstinately to any one of these plans we will be often right; but assuredly we will be not seldom wrong. On the other hand, by giving a discretional power to adopt one or other of them, as symptoms may indicate, we confer a licence on the young beginner, for which he probably will not thank us in the hour of trial or responsibility. He who could lay down one fixed principle, which is uniformly to be kept in view, through every case and every climate—a principle that would explain the phenomena and the cure; who could give *plain and easy directions* when and where we are to lean towards one or other of the apparently opposite modes of treatment, without ever losing sight of the principle in question, or for a moment relaxing in the pursuit of that salutary object which this principle points to, would certainly deserve the thanks of the junior branches, at least, of the profession.

I have hinted what I suppose to be the origin of these clashing theories and practices; to wit, the mistaking effects for causes. Thus, if we do

find stricture in any part of the intestinal canal, what produced it? This must evidently be the effect of some cause. If we find inflammation there, it may be looked on as a consequence, rather than a cause of dysentery, from this plain fact, that in original and unequivocal inflammation of the bowels, or general enteritis, constipation is almost always present. In hot climates, if we find dysentery, or (as some will not allow it that name) flux, a pretty constant attendant on hepatitis, particularly the languid or chronic species of it, it does not follow that hepatitis is a general concomitant, much less a cause of dysentery. In many cases of hepatitis, especially when violent, there is obstinate costiveness; and in numerous fatal cases of dysentery, no structural derangement in the liver can be observed.

Those who have attributed it to suppressed perspiration, have come nearer to, but stopped short of the mark. The suppression of this discharge is, in itself, a trifling, though in its connexion with others, it becomes an important feature in the proximate cause of dysentery.

As causes can only be traced by their effects, we must endeavour to find out, among the latter, such as are *always* present in dysentery, and have a decided *priority* in occurrence. These, I conceive, constitute what is meant by proximate cause in this, as well as in every other disease. Are there any such, then, in dysentery? I believe there are; and this belief does not rest on speculative grounds.

In every case of dysentery that has ever come within the range of my observation, two functions were invariably disordered from the very onset, and soon drew other derangements in their train. These were, the functions of the skin and of the liver; or, perspiration and biliary secretion. I defy any one, who has minutely regarded this disease at the bedside, to produce a single instance in which these functions were carried on in a natural manner, at any period of the disease. The partial clammy sweats which are sometimes seen on the surface, with the occasional admixture of bilious sordes in the stools, so far from being objections, are proofs of this position; for, excepting the above appearances, which are *unnatural*, the regular perspiration is obstructed, and the healthy secretion of bile suspended or impaired.

These, then, are the two first links of that morbid chain which connects the remote cause with the ostensible form of the disease. Whoever can break these, by restoring these two functions to their natural state—he will cure, or rather prevent, the disorder.—But we can seldom expect to be called in at this early period, for dysentery is not yet manifested; although an accurate observer might, in his own frame, often detect these nascent movements, and, by prompt measures, extinguish the disease *in embryo*.

Some other invisible, at least, very obscure links, are now to be noticed:—for however confidently a *proximate cause* may be decided on in colleges and closets, it is, in nature, a series of causes. The equilibrium of the circulation and excitability becomes disturbed. In consequence of the

torpor in the extreme vessels on the surface, the volume of blood is directed to the interior, and the balance is still farther broken by the check which the portal current meets in the liver, from a corresponding torpor in the extreme or secreting vessels of that organ; the effect of which is, that the plethora in the cœliac and mesenteric circles is now greatly augmented, and febrile symptoms commence. The perspiration being stopped, a vicarious discharge of mucus is thrown from the extremities of the turgid mesenteric vessels upon the internal surface of the intestines, which by this time are in a state of irritability. The disease now begins to exhibit itself unequivocally, by the uneasiness in the bowels, the frequent desire to stool, and the mucous discharges. We may now plainly perceive how all those consequences, which have so often passed for causes, can arise. If the plethora be great, blood itself will be poured out from the mouths of the distended mesenteric and meseraic vessels; hence inflammation and ulceration may ensue. If any hardened fæces lurk in the cells of the colon, they will be grasped by the irritable circular fibres of the intestines, and rings or strictures will augment the tormina and griping in the bowels.

In this situation, Nature evidently attempts to restore, by re-action, the balance of the circulation and excitability with the cuticular and hepatic functions, but she rarely succeeds; her abortive efforts too often aggravating, instead of relieving the symptoms. Thus, we sometimes see a partial, ill-conditioned sweat on the surface, which is productive of no benefit; while, from the liver, an occasional gush of vitiated bile, like so much boiling lead, throws the irritable intestines into painful contortions, and then the tormina and tenesmus are insufferable! Where she ultimately gains her end, it is where the local plethora is reduced by the discharge from the mesenteric and meseraic vessels, without occasioning much organic derangement in the bowels. This being effected, she more easily restores the equilibrium of the circulation and excitability and the functions above-mentioned. But, in a great majority of cases, where the disease is violent, her exertions either hasten the fatal catastrophe, or produce such lesion of structure and function in the chylopoietic viscera as induces a tedious chronic state of the complaint, very difficult to manage.

The febrile symptoms will, at first, be in proportion to the *general* disturbance in the balance of the circulation and excitability; they will afterwards be kept up, or modified, by the extent of the organic derangement sustained. The discharge of blood by stool, on the other hand, appears to be proportionate to the *local* plethora in the portal and mesenteric circles, and to the permanence and degree of torpor in the liver, occasioning that plethora.

This doctrine, thus briefly sketched out, if impartially considered, and fairly applied, will, I think, clearly account for every phenomenon of the disease, from the derangement of the liver, the largest of all glands, to that of the mesenteric glands themselves, which have, in their turn, been considered as the seat, or even the cause of dysentery.

But it is not sufficient that it merely accounts for the phenomena. If founded in nature and truth, it should, like an arithmetical rule, prove itself in various ways. Above all, the practical application of it ought to involve no contradictions; however various the routes may appear, they must all be shewn to tend ultimately to one point—the cure. It should explain how different means have attained the same end; and, finally, it should chalk out the best and nearest path we are to pursue. To this task I consider the doctrine in question perfectly equal; though I shall not apply it farther than to the leading phenomena of the disease, and the principal methods of cure.

Of the former I have spoken; I now come to the latter. The practitioner who has set down an inflammatory state of the intestines as the cause of dysentery, comes to a patient, who is very ill with violent tormina and tenesmus; and passing blood, in alarming quantities with his stools, which consist of nothing but that and mucus. He bleeds copiously, as his principal indication, and prescribes laxatives or sudorifics as minor means, and in a trifling way, as auxiliaries. He soon finds that the flow of blood by stool is much reduced—that the tormina are mitigated, and that something more than mere mucus comes away after the laxatives, with considerable relief to the patient. Nothing can be more plain than the way in which these means are beneficial, on the principle in question. Venesection lessens at once the plethora in the mesenteric vessels, and checks the effusion from their mouths. A general relaxation throughout the whole system follows—intestinal strictures are relaxed—scybala and fæcal accumulations pass off; and Nature, thus relieved, attempts a restoration of equilibrium in the circulation and excitability, evinced by some degree of action in the extreme vessels on the surface, and, by sympathy, of the secreting vessels in the liver.

So far the physician has greatly assisted the spontaneous efforts of the constitution; and if the latter be equal to the task of keeping things in this prosperous train, all will be well—if not, the morbid state returns, and with it a fearful debility which paralyses his arm, and embarrasses his mind! His patient may, or may not recover; but I should not like to be in his situation, under a man who confines his principal aim to the obviating of inflammation.*

He who confides in purgatives, from an idea, that stricture and a retention

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* Since the first edition of this work was printed, Dr. Somers has drawn the attention of the medical world to *extreme* venesection in dysentery as it appeared in the Peninsula. But I believe that experience, in tropical climates at least, will only assign venesection its proper rank as a powerful *auxiliary* in the treatment of this formidable disease. Dr. Somers has not the honour of originality here. Dr. White used the same *venesectio ad deliquium*, in Egypt, in 1802. And Mr. White, a Navy Surgeon, published a work nearly a hundred years ago, in which he lays down a still more decisive system of bloodletting in dysentery.

of the natural fæces are the essence of dysentery, treads on exceedingly tender ground. He certainly does assist Nature in her most ostensible, but dangerous method of cure. If, by a course of purgatives, he can lessen the local plethora, and excite the healthy action of the liver before any material injury takes place in the intestinal canal, he will succeed: because the general balance of the circulation will soon be restored, when the portal and mesenteric plethora is removed; and the sympathising function of the skin will participate in the healthy action of the liver. But, in a large proportion of cases, he will have the mortification to find, that such organic derangements occur, before he can attain his object, as will either hasten the fatal termination, or prove a fruitful source of misery in the chronic stage of the disease, which too often ensues.

The rationale of the emetic and sudorific plans, on the principle in view, is sufficiently obvious. They not only determine generally to the surface, but, by exciting the healthy action of the liver, they locally relieve the meseraic and mesenteric plethora, (a circumstance which their employers did not calculate on)—and thus restore the balance of the circulation with the functions of perspiration and biliary secretion.

The mercurial plan is of a very different stamp, in regard to its applicability. The Army or Navy Surgeon, who has a vast number of dysenteric patients coming every day under his care, knows, by repeated observations, that if he can bring on ptyalism, the patient is secure for that time; and this begets a strong bias, in favour either of the *specific* power of mercury, or of the liver being the primary seat of the disease. With these prepossessions, he drives on for the object in view, regardless of particular symptoms, and disdaining to call in the aid of those means which I have been describing, and which are considered by others as the principal remedies. He is generally successful, but occasionally he is foiled, and cannot raise a ptyalism—then his resources are gone! The patient wastes away—inflammation, ulceration—even gangrene, may supervene; or, some morning, he sees, with astonishment, several inches of the rectum, that have passed off by stool in the night!

Thus we see, that any one of the above methods, when set up as a principal to the exclusion of others, is attended with inconvenience, and (excepting perhaps the last) with repeated failures, if not general want of success, particularly in hot climates. A heterogeneous combination of them all, on the other hand, without order or discipline, and guided only by the discretion or caprice of the young practitioner, would be little better, if not worse, than a blind adherence to one. Nothing, in short, but a controlling principle, that is ever to be held in view, under whose superintendence the above-mentioned agents are to be employed in their proper spheres, can lead to a settled and rational practice in dysentery, or reconcile those jarring opinions and practices with which both books and men continue to puzzle

the minds of all those whom personal and wide experience has not emancipated from the trammels of authority.

I have declared the *principle* that is to govern us (the restoration of *healthy* perspiration and biliary secretion, with an equilibrium of the circulation and excitability), and enumerated, in a general way, the means which we are to use;—the direct application of the whole to practice, will be illustrated presently by an appeal to facts.

I have purposely avoided, as much as possible, throughout this Essay, to quote my own cases, in support of my own doctrines. The following short narrative, however, may be allowed a place here; and may not be uninteresting or uninstructive:—

A very few weeks after my first arrival in Bengal, I made one in a party of officers, who landed a few miles below Kedgeree, for the purpose of shooting and of seeing the country.—The day was excessively hot—the ground was half inundated, and we waded and rambled about, through marshes, jungles and paddy-fields—often with one half our bodies under water, and the other broiling in the sun, till we were fairly exhausted. As we had a sumpter-basket with us, we spent the whole day in this manner; and on returning in the evening to the banks of the Ganges, at a place appointed, we found that the boat could not approach the shore, the water was so shoal; we therefore dashed into the river, and waded off to where the boat lay at a grapnel. By this time it was sunset, and as we had a strong tide against us, we sat in the boat nearly two hours, dripping with wet and shivering with cold, before we got on board. That night my sleep was disturbed, and I felt slight rigors or chills, alternated with flushes of heat; but in the morning I got up as usual, and concluded that all was well. At dinner I had no appetite; and soon afterwards I felt uneasiness in my bowels. As the evening advanced, I had frequent calls to stool, with griping and some tenesmus, nothing coming away but mucus. Fever now came on—my skin became hot, dry, and parched,—and by 11 o'clock at night, I could scarcely leave the commode. The misery of that night will never be erased from my memory! I was often delirious, especially when I lay down in bed; but indeed so dreadful were the tormina and tenesmus —so incessant the calls to stool, that little respite could be procured. I had taken a dose of salts in the evening, but they afforded very trifling relief, except by bringing off some feculencies, attended with a momentary lull. Early in the morning, a medical gentleman, belonging to an East Indiaman, visited me, and found me in a very bad way. I was now passing blood fast, and the fever ran high. I was bled, and took an ounce of castor oil immediately; a few hours after which, six grains of calomel, and one of opium, were taken, and repeated every five hours afterwards, with occasional emollient injections.

This day passed rather easier than the preceding night—the tormina

were somewhat moderated by the medicine; but I had considerable fever —thirst—restlessness, and continual calls to stool; nothing, however, coming away, but mucus and blood. As night closed in, the exacerbation was great. The opium lulled me occasionally, but I was again delirious; and the phantoms that haunted my imagination were worse than all my corporeal sufferings, which were, in themselves, indescribably tormenting. The next day I was very weak; and so incessant were the griping and tenesmus, that I could hardly leave the commode. The tenesmus was what I could not bear with any degree of fortitude; and to procure a momentary relief from this painful sensation, I was forced to sit frequently in warm water. The calomel and opium bolus was now taken every four hours, with the addition of mercurial frictions. An occasional lavement was exhibited, which gave much pain in the exhibition, and I each day took a dose of castor oil, which brought off a trifling fæculence, with inconsiderable relief. My fever ran higher this day than yesterday, with hot, dry, constricted skin. As night approached, my debility and apprehension of the usual exacerbation brought on an extreme degree of mental agitation. The surgeon endeavoured to cheer me with the hope of ptyalism, which, he assured me, would alleviate my sufferings—I had then no local experience in the complaint myself. As the night advanced, all the symptoms became aggravated, and I was convinced that a fatal termination must ensue, unless a speedy relief could be procured. I had no other hope but in ptyalism; for my medical friend held out no other prospect. I sent for my assistant and desired him to give me a scruple of calomel, which I instantly swallowed, and found that it produced no additional uneasiness—on the contrary, I fancied it rather lulled the tormina. But my sufferings were great—my debility was increasing rapidly, and I quite despaired of recovery! Indeed, I looked forward with impatience for a final release! At four o'clock in the morning, I repeated the dose of calomel, and at eight o'clock (or between 60 and 70 hours from the attack) I fell, for the first time, into a profound and refreshing sleep, which lasted till near midnight, when I awoke. I was some minutes before I could bring myself to a perfect recollection of my situation prior to this repose; but I feared it was still a dream, for I felt no pain whatever! My skin was covered with a warm moisture, and I lay for some considerable time, without moving a voluntary muscle, doubtful whether my feelings and senses did not deceive me. I now felt an uneasiness in my bowels, and a call to stool. Alas! thought I, my miseries are not yet over! I wrapped myself up, to prevent a chill, and was most agreeably surprised to find that, with little or no griping, I passed a copious, feculent, bilious stool, succeeded by such agreeable sensations—acquisition of strength, and elevation of spirits, that I ejaculated aloud the most sincere and heartfelt tribute of gratitude to Heaven for my deliverance. On getting into bed, I perceived that my gums were much swollen, and that the saliva was flowing from my mouth. I

took no more medicine, recovered rapidly, and enjoyed the best state of health for some time afterwards.

Of the *remote* causes I need say little. They are the same in all parts of the world—atmospherical vicissitudes. Perspiration and biliary secretion being in excess during the intense heat of the day, are so much the more easily checked by the damp chills of the night; and the consequences which ensue are clearly deducible from the principle I have stated. In short, the same general causes produce bilious fever, hepatitis, and dysentery. They are three branches from the same stem, the organs *principally* affected occasioning the variety of aspect.

Dysentery, *cæteris paribus*, will be the most frequent form: first, on account of the injury which the intestines are in the habit of previously sustaining, from the irregular or disordered function of the liver, whereby they become weakened and irritable; secondly, because they are destined, by Nature, to sustain the vicarious afflux of suppressed perspiration. They are all cured on the same principle, and with some slight variety, arising from local circumstances, by the same remedies—a strong proof of the connexion which I have traced.

We now see how a few years' residence in hot climates predisposes heedless soldiers and sailors to dysentery, as is well known to those who have practised between the tropics. The same principle explains the reason why we so frequently find dysentery a concomitant on hepatitis, especially that languid species of it arising from obstruction and congestion, with previous derangement of function in the liver, rather than acute European inflammation. In the latter, as in enteritis, the bowels are, for the most part, costive. We next proceed to the cure, and various practical remarks connected with it.

When blood appears alarmingly in the stools, whether the fever run high or not, venesection may be employed freely without the smallest apprehension of that bugbear—DEBILITY. Emollient oily glysters may also be occasionally thrown up, to lull the tenesmus; but, as the rectum is generally in a very irritable state, glysters are often unmanageable remedies. A flannel shirt is to be put on, and a bandage of the same, with a double or treble fold of flannel round the abdomen. After the bleeding, a scruple dose of calomel with a grain of opium should be given, followed in three hours by castor oil—the best medicine I can recommend for the purpose of bringing away hardened fæcal or vitiated bilious accumulations, where the gastric and intestinal irritation is previously allayed by the calomel and opium; and it will in that manner soothe the tormina and tenesmus. The oil may be repeated every morning; but it is never to intercept the progress of the main remedy, which consists of full doses of calomel with antimonial or ipecacuanha powder, proportioned to the severity of the case, and persisted in till mercurial influence is established, or till a perfect relief is obtained, as evidenced by healthy secretion.

Thus, in less than a page, is stated a practice, which, being founded on principle, is generally applicable to almost every stage and degree of dysentery, and contains within itself resources against most emergencies. While we proceed directly forward to our final object—the restoration of the cuticular and hepatic secretions, with an equilibrium in the circulation and excitability, by a combination of mercury and diaphoretics, we lull pain, and relax strictures at the same time, by the opium. To guard against inflammation of the intestines, we have the lancet on one side—and to carry off diseased or irritating accumulations, we have laxatives on the other; the fever, being principally symptomatic, will of course cease with the cause. For the successful issue of this treatment in general, I appeal to the rigid test of future experience with others, perfectly conscious, from my own, of its superior efficacy.

Hitherto, I have only presented the favourable side of the picture to view; it now becomes a duty to exhibit its sad reverse! In doing this, however, I have the consolation of hoping that, sooner or later, it may induce those in whose hands alone the remedy is placed, to apply it efficaciously. I may add, that the *rationale* which I have attempted of the disease, is equally elucidatory of the failure as of the success, in the *methodus medendi* recommended.

Those, then, who have had most experience in hot climates, best know the melancholy fact, that in every repetition of dysentery, and after every successive year of our residence between the tropics, we find the remedy has greater and greater difficulty in conquering the disease. In process of time, as the intervals between attacks become curtailed, we find it a very tedious process to bring the mouth affected with mercury; and, what is still worse, the check thus given to the complaint is only temporary; for soon after the influence of the medicine wears off, our patient returns upon our hands as bad as ever. At length the system absolutely refuses all impregnation from mercury; and we have the mortification to see our patient waste away, and die, for want of the only remedy that possibly could arrest the hand of death—CHANGE OF CLIMATE.

And how can it be otherwise upon the principle which I have stated? The perspiratory and biliary vessels become gradually weakened, by their inordinate and irregular action, from the stimulus of atmospherical heat: they are consequently more and more easily struck torpid by the least atmospherical vicissitudes, and require the additional stimulus—or rather, the change of stimulus from medicine, to excite their healthy action. Hence, the longer we ring those changes, the nearer we approach that state when the vessels, at last, cease to obey all stimuli—the functions alluded to cannot be restored, and the unhappy victim dies! Add to this, that the intestines themselves become more irritable by every subsequent attack, and even without any attack, by the impaired state of the functions in question, which annually increases.

An infusion of quassia, or other light bitter, should be immediately commenced on leaving off the mercury, and continued till the stomach and bowels have recovered their vigour. This should never be omitted.

It is hardly necessary to remark, after the principles which I have laid down that flannel next the skin is indispensable, and that the most scrupulous attention in avoiding dews, damp night air, or sudden atmospherical vicissitudes, is necessary during convalescence, to prevent a relapse.

In no disease is patience, on the part of the sick, a greater virtue, or more calculated to forward the good effects of medicine, than in dysentery. If obedience be paid to every call of nature, the straining which ensues is highly detrimental, and, I am convinced, augments, in many cases, the discharge of blood—every motion of the body, indeed, increases the desire to evacuate. As little or nothing, except mucus and blood, comes away in four efforts out of five, we should endeavour to stifle the inclination to stool; and (as I know by personal experience) we shall often succeed; for the tormina go off in a few minutes, and by those means we elude not only the straining, but the painful tenesmus, which continues so long after every fruitless attempt at evacuation. This circumstance, though apparently of a trifling nature, is of considerable importance; and yet it has been seldom attended to, either by authors or practitioners. It has the sanction of antiquity, however, as may be seen in the following precept of Celsus—" Et cum *in omni fluore ventris,* tum in hoc precipue necessarium est, non quoties libet desidere, sed quoties necesse est; ut *hæc ipsa mora* in consuetudinem ferendi oneris intestina deducat."—*Lib.* iv. xvi.

The diet in dysentery must, of course, be of the most unirritating and farinaceous nature: such as sago, arrow-root, rice, &c. A very excellent dish for chronic dysenterics, is flour and milk, well boiled together, which, with a very little sugar and spice, is highly relished by the debilitated patient.

But there is one remark applicable to this, and every febrile complaint, whatever may be the organ most affected; namely, that, when convalescence does take place, the appetite too often outstrips the digestion, and so do chylification and sanguification exceed the various excretions, so as to occasion a dangerous inequilibrium between assimilation and secretion; the consequence of which is, that the weakest viscus, or that which has suffered most during the previous illness, becomes overpowered, and relapse ensues! This is the great error of inexperience, and it is generally seen too late!—I appeal to clinical observation for the truth and the importance of these remarks.

A Practical Treatise on Tropical Dysentery, more particularly as it occurs in the East Indies. By R. W. Bampfield, Esq.

[ANALYSIS.]

The work, though there is no formal division of chapters to that effect, may be said to consist of three parts. The 1st treats of *acute;* the 2d of *chronic dysentery;* and the third describes another species, which the author chooses (whether rightly or not will appear in the sequel) to denominate *scorbutic dysentery.* I shall briefly review each of these in the order here mentioned.

I shall begin by extracting the author's description of the species and varieties he has observed in tropical dysentery, whether acute or chronic.

"Species 1ma. *Dysenteria acuta. Character;* while the fæces are commonly retained, frequent evacuations from the intestines, consisting of mucus, serum, or blood, or a mixture of these, take place; and are preceded and attended by pain in some part of the abdomen, and accompanied and followed by tenesmus: pyrexia is not often evident, but is sometimes urgent.

It varies in degree. (A.) *Dysenteria mitis.* In which the stools are not frequent; the quantity of mucus or serum evacuated is small, and rarely tinged with blood; there is not any fever present; and the pain of the abdomen is never constant, and is only felt, together with tenesmus, about the periods of evacuation.

(B.) *Dysenteria severa.* In which the stools are frequent, and recur from twelve to forty-eight times, or even oftener, in twenty-four hours; the excretions of mucus, or serum, and the discharges of blood, or a mixture of these three, are copious. The tenesmus and tormina, about the periods of evacuation are severely felt; but there is no *constant,* fixed, and acute pain in any part of the abdomen, or unequivocal synocha.

(C.) *Dysenteria inflammatoria.* In which there is a constant fixed, acute pain of some part of the abdomen or intestinal canal, including the parts contained in the pelvis; unequivocal inflammatory fever (or synocha); obstinate retention of fæces, while there are very frequent and copious dejections of mucus, serum, or blood, or a mixture of these, together with severe tormina and tenesmus. The blood drawn and concreted exhibits the inflammatory buff.

Species 2da. *Dysenteria chronica.* The acute is frequently succeeded by chronic dysentery, as a sequela of the varieties B. and C. In chronic dysentery, the fæces are not retained; but frequent, loose, fæcal stools (a state which, for brevity, I shall term diarrhœa,) ensue, mixed with dysenteric excretions, and accompanied with tenesmus and tormina.

Acute dysentery is sometimes followed by diarrhœa, uncombined with

dysenteric excretions, that will be noticed when we come to the treatment.

Variety (A.) In which diarrhœa is accompanied with an uniform continuance or a frequent recurrence of dysenteric excretions, and of intestinal pains at the periods of evacuation.

(B.) In which the dysenteric excretions of the intestines are continued and often evacuated, while the bowels observe regular periods of discharging fæces of natural consistence and colour, the same as in health.

(C.) In which the chronic stage of dysentery is protracted by an ulceration or excoriation of the intestines: the diarrhœa and morbid secretions are maintained; and pus is observed in the evacuations.

(D.) In which the chronic stage is protracted by a diseased enlargement of the mesenteric glands, and, with the following variety, may be considered symptomatic.

(E.) In which it is maintained by an abscess formed in one of the abdominal viscera or their membranes, and is generally accompanied by hectic fever." p. 2, 3.

This arrangement is certainly logical and luminous, but I scarcely see any advantage in thus splitting down diseases into so many minute varieties. It was the celebrated Cullen who gave currency to this custom, swayed, perhaps, more by the example of preceding nosologists than by his own excellent judgment. Of some diseases this famous physician has enumerated as many varieties as there are exciting causes! Upon the whole, I greatly doubt whether such minuteness of diagnosis is often possible, or, if it be, whether it is of any avail in actual practice.

I shall now follow the author into his account of the first or acute species. He has never seen any thing that could lead him to suspect dysentery to be contagious. This entirely coincides with my own observations, and not with mine merely, but with that of every modern practitioner with whom I am acquainted. The opinion of Cullen, Pringle, Hunter, Harty, and others, upon this point must, therefore, be set aside. Either the dysentery of their day was a different disease from what it now is; or these eminent individuals were betrayed, by their preconceived ideas, into a mistake.—It is surely of very little present importance which of these alternatives may be the truth; for opinions must now-a-days be decided, not by authority, but by the touchstone of facts carefully observed and faithfully recorded.

Mr. Bampfield very candidly admits that he has seldom or never found scybala in the stools of dysenteric patients. This is another particular in which his observation coincides with mine.

The author goes on to describe the symptoms that affect the tongue and fauces, the stomach, intestines, and liver, the urinary organs, the vascular and nervous systems, together with the appearances on dissection in dysentery. What he has advanced on these subjects is exceedingly accu-

rate and methodical, but not particularly new. I shall, therefore, pass over this part altogether, as I shall also the chapters on diagnosis and prognosis, and proceed at once to his observations on the *predisposition* to this *disease*. He is of opinion that the predisposition to an increased secretion from the lining membrane of the organs of smell and respiration in Europe, becomes, in India, a predisposition to increased secretion from the villous coat of the intestines. Hence fluxes are as common in the latter climate, as coughs and colds are in the former. This conversion or change in the *locale* of increased action, he thinks chiefly attributable to the indulgences in heavy and stimulating diet, and the imprudent exposures to the night air, of which the unwary European, newly arrived from his native climate, is wont to be guilty. Atmospheric vicissitudes, by checking perspiration, produce a similar detrimental effect. I do not recollect that the following circumstance has ever been noticed heretofore as a predisposing cause of dysentery:—

"The copious perspiration of the newly-arrived European becomes accumulated, when he is sitting or walking, on the lower part of the shirt, more especially about that part of the abdomen where the waist-band of the small-clothes or pantaloons presses against it, the tight or close application of which occasions an increase of heat and of perspiration at this particular part, during the day, and intercepts the exhalation as it flows down the body; hence, if he should lie down in this state, cold will be induced on a particular part of the abdomen, by the evaporation of the exhaled fluid from the wet linen in contact with it; perspiration, before profuse, will be now effectually suppressed, and its injurious consequences be felt by the chylopoietic viscera."—p. 69.

According to our author's observations, the stools in dysentery are more frequent during the night, and especially towards morning, than at any other period of the twenty-four hours. This he seems inclined to ascribe to "solar influence."

"The periods of dysenteric attacks and relapses I have observed to be more common at the plenilunar and novilunar periods, than at the interlunar intervals. But whether the increased attraction of the moon at the change and full, has any *direct* power in producing diseases, I believe will never be satisfactorily determined; and, notwithstanding the ingenious hypothetical explanations of Dr. Balfour, Dr. Darwin, and others, I am induced to conclude that it has only an indirect influence or power by the changes which it occasions at those periods, on the atmosphere and winds; for the prevalence of fresh winds, strong gales, and showers of rain, has been observed to be much greater at these periods of the moon, than at the interlunar intervals; and these, by checking perspiration, produce effects on the constitution excitive of many acute diseases, which have been in part ascribed to the direct agency of lunar attraction on the fluids of the body,

by supposing that it decreases the gravity, and diminishes the stimulus, of the particles of the blood."—p. 84.

With regard to the proximate cause, our author seems to be of opinion that dysentery is, to all intents and purposes, inflammation: or if these two diseases are not exactly identical, that, at least, the former is attended with analogous symptoms and actions of vessels, and is followed by similar consequences, as inflammatory action of other organs of the body. What tends to confirm him in this theory is the disclosure so often made by dissection. On examining the body after death, we find visceral enlargements and adhesions, a bloodshot appearance of the intestines, ulcers, abscesses, and sometimes mortification, similar to what are observed after inflammation of other parts, external or internal. These appearances are very striking, yet we hold them to be equivocal. Mr. B., like many others, has been deceived by confounding the ultimate changes with the primary diseased movements. I am, in every case, inclined to regard inflammation rather as a sequence than a cause of dysentery, as a contingent effect, and not as an uniform result. Indeed the author goes nigh to admit this; for in order to make good his theory he is obliged to extend the term inflammation to *every increased action* of the capillary vessels of secreting membranes. He says,

"Those who do not choose to admit inflammatory action to be, in all cases, the proximate cause of dysentery, in mild and less severe cases, still call it an increased and morbid excretion of the capillary vessels of the intestines, although it is, assuredly, equally philosophical to denominate this action in dysentery inflammatory, as it is the action of the minute secreting vessels of the urethral membrane in gonorrhœa, or of the membranes of the bronchia and nose in catarrh; for in mild cases of those diseases, the pain accompanying them is not constant and acute, nor accompanied with fever or hard pulse; nor are recoveries often doubtful."—p. 90.

But although it may be incorrect in speculation to view dysentery and inflammation as one, it will generally be safe in practice to apply to the former the same *principles* of treatment as to the latter. We should never forget that a disease, though not primarily inflammatory, may often have a strong tendency to run into that state. This I believe to be the case in dysentery; consequently we should use the lancet as boldly in the early stage of that disease, as we do in severe cases of spasmodic colic, and with the same views, namely, to remove pain; and (above all) to *prevent inflammation*. Whenever the pulse and heat are high, and the abdomen painful on pressure, that is to say, *permanently* painful on pressure, and the pain is confined to any given point, there is reason to fear that local inflammation is begun there; and thenceforward it behoves us to subdue it by vigorous depletion. The mere

intensity of the febrile symptoms, considered *per se*, is by no means to be neglected; for, as the author judiciously observes, "fever rarely exists in the tropics without being occasioned by local inflammation or determination."

This leads me to speak more in detail of the mode of cure laid down by Mr. Bampfield. The remedies he trusts to are, 1st, bleeding; 2d, cathartics; 3d, diaphoretics; and, 4th, mercurials. He discusses these under separate heads, and each of them at considerable length. His remarks on bloodletting are singularly valuable, and have my cordial approbation. I think he has deserved well of the profession for the pains he has taken to introduce this remedy to more general attention. It is gratifying to think that experience of matters of great importance, is always uniform; and that where it finds men willing to obey its dictates, it always conducts them to the same mode of practice. For instance, it was not by any preconcerted opinions that Mr. Bampfield was induced to employ the lancet in dysentery; but by the careful observation of actual cases. I can say the same thing of myself, for experience led me to the same conclusions with those here stated by the author. I well recollect the reluctance and trepidation with which I first "wetted a lancet" in a disease where it had been totally proscribed by the concurrent authority of all those authors whose works on the subject were most esteemed. "We watched the patient (says the reviewer in the Medico-Chirurgical Journal *) in anxious dread of those formidable consequences which had been alleged to follow venesection. But the result was quite contrary to what we had been taught to expect; for all the severe symptoms were greatly mitigated by the evacuation. Emboldened a little by success, we began cautiously, but regularly, to employ bloodletting whenever the state of the pulse and the heat of skin seemed, on general principles to warrant it; and ere long we found that dysentery, from being an unmanageable and baffling disease, was converted into a form much more responsible to the ordinary medical treatment. Even when the quantity of blood evacuated by stool was so considerable as to cause debility or prostration of strength, we did not refrain from the lancet: nay, we considered the use of it to be rendered, if possible, more imperative on that account; for we viewed the hæmorrhage from the intestines to be *active* in its nature, and thought it as incumbent upon us to check it by venesection, as it is to check (by bleeding at the arm) hæmoptysis, or any other internal hæmorrhage. We are convinced that four ounces of blood lost by the anus cause more debility than four and twenty lost by the arm. We look upon bloodletting to be a very great improvement in the modern treatment of dysentery. We give the praise of it to modern times, because, although it was practised and recommended by Sydenham, we greatly doubt whether the limited quantities

* I may here state the Reviewer's name—Dr. Archibald Robertson, of Northampton.

he was in the habit of taking away could have exerted any very marked benefit on the disease."

It is, we believe, to Dr. Whyte that the profession are indebted for having shewn the perfect safety of this remedy: and had this gentleman lived to publish more extensively upon his experience, we have little doubt that venesection would have been earlier and more effectively adopted in military and naval practice than it has been. But the premature death of this lamented individual, from inoculating himself with the matter of a plague bubo, cut him short in the middle of his honourable career; and the air of rashness which attended the circumstances of his decease induced many to discountenance the practice (stated in his letter to H. R. H. the Duke of York; see Med. and Phys. Journal, vol. ii.) of bleeding to syncope in dysentery, as the hazardous experiment of a well-meaning, but hot-headed, medical enthusiast. In consequence of this prejudice, bloodletting never became fully established as a remedy in this disease, until the late Peninsula campaigns. Experience there pointed out to military medical gentlemen a similar mode of treatment to what had suggested itself to Mr. Bampfield and others of his naval brethren employed within the tropics. The whole of our author's section on this subject is so excellent, that we are at a loss what paragraph to extract in preference to another. We take the following passages almost at random.

"In dysentery it happens that a certain degree of debility must be induced, either by the antiphlogistic regimen, or by the protracted disease gradually exhausting the animal and vital powers; hence it is thought preferable to induce a certain degree of it at once (by bleeding to wit), and thus put a speedy termination to the disorder, and prevent the distressing, and sometimes fatal effects, of the chronic stage."

"In this disease, venesection is said to be injurious by Dr. J. Clark, (p. 324, 325) and probably his authority has given rise to the neglect and omission of the practice. He admits that 'no evacuation is better calculated for the relief of the patient, when the disease is accompanied with a fever of the inflammatory kind. But, in hot climates, fluxes being either of a chronic nature, or accompanied with a low fever, the strength of the patient sinks from the beginning.'"

It is granted that there is a peculiar sensation of debility, the companion of the very severe and inflammatory varieties of dysentery, resembling what occurs in enteritis, and this sensation is maintained and increased by the constant dysenteric evacuations, the severe pains, the want of sleep, and the exhaustion of the sensorial power in the sensitive and irritative motions: but as no judicious practitioner is deterred from bleeding by the peculiar sensation of debility attending gastritis and enteritis, so let no one be deterred from employing it in the inflammatory forms of dysentery. It has been already remarked, that the chronic stage is generally a sequela to the severe and inflammatory varieties, if their acute stage be not arrested and

cured. If bleeding be not employed in the inflammatory variety, either death, or a very long chronic stage, almost invariably ensues. Hence bleeding often does away with the "chronic nature of fluxes." I have not observed that the "fever" which accompanies dysentery is particularly "low:" however, Dr. Cullen, in his *Nosology*, has enumerated "typhus fever" as a characteristic symptom of enteritis, but he nevertheless recommends bleeding for its cure. The author adds—

"Venesection can be dispensed with in the milder and safer forms of dysentery, where the symptoms of inflammation are not present, where the pain is only occasional, and the evacuations are not copious nor frequent: these varieties will, in general, yield to the other remedies employed for the cure of dysentery." p. 110, 111, 113.

I cannot bestow so much commendation upon our author's chapter on cathartics as upon that on bleeding. I conceive the purgatives recommended by him to be far too drastic and stimulating; and I entertain very serious doubts whether jalap, extract of colocynth, or infusion of senna, can be with propriety employed in any stage of dysentery. Surely, on his own notions as to the strictly inflammatory nature of the disease, these medicines must be highly unsuitable; for would it not follow, from his doctrine, that they should aggravate the symptoms? What practitioner will venture to prescribe drastic purgatives in enteritis, or to excite vehement action in an intestine whose calibre is already inflamed? If it is necessary to give rest to an inflamed muscle, or to withhold the stimulus of light from an irritable eye, it is no less necessary to tranquillize and soothe the bowels by all the means in our power. In dysentery, when purgatives are necessary (and generally they are indispensable), I never employ any other than those of a mild and lubricating nature. Castor oil is almost the only one that is proper; and when it is necessary to increase its activity, that can be readily accomplished by adding to it a few grains of calomel. Indeed Mr. B. himself is fully aware of the virtues of this medicine.—The following passage is an excellent one, though rather at variance with his recommendation of the dry and more acrid purgatives.

"The oleum ricini is, perhaps, better calculated to afford relief in dysentery than any other aperient or cathartic; for its action is not only mild and generally effectual, but I have observed that some of it passes undecomposed, in its oily form, through the intestines, and appears on the surface of the excrement, and hence may serve as a sort of sheather or defence to the diseased intestines from the stimulus of fæces and mordid secretions."—p. 124.

The observations on diaphoretics contain nothing new; we shall, therefore, pass on to the subject of mercurials.

The author has been in the habit of prescribing calomel, but he seldom gives it alone. He thinks it greatly better to combine it with other purgatives, or with ipecacuanha. This remedy is generally given with the view

of correcting the condition of the liver; for all practitioners concur in thinking that the function of this mighty gland is greatly depraved in dysentery, though they may differ in opinion as to the relative importance of this depraved state—some regarding it as the primary cause of the symptoms; and others viewing it merely as one link in the chain of effects. It would probably be alike tiresome and unprofitable to the readers were I, in this place, to enter into minute discussions on the subject. I shall, therefore, waive the matter altogether, only remarking that I suspect the liver has not, till lately, been allowed its due share of importance among the phenomena of this disease. I am persuaded that much of the exquisite pain and tormina is assignable to vitiated bile passing over the irritable, excoriated, or ulcerated surface of the intestines; for I do not see how otherwise the pain, which succeeds the fullest operation of a cathartic, is to be accounted for. The renal discharges also afford an additional presumption that unhealthy bile performs an important part in the malady. When the urine is collected, it is generally of a green or yellowish colour, and tinges linen, evidently from the admixture of bile; and it is generally passed with considerable heat and smarting. The latter uncomfortable sensation is always ascribed to *sympathy* betwixt the rectum and bladder; but instead of taking for granted that tenesmus is the cause of the difficult micturition, it is more reasonable to believe that the bile, mixed with urine, is the occasion of that teasing phenomenon.

The mercurial preparations prescribed in dysentery are found to produce a solution of the disease; but whether they do so by rectifying the hepatic secretion, or by producing some more secret and inexplicable change in the system at large, is, at present, quite unknown. One thing, however, is certain:—as soon as ptyalism takes place, the disease generally disappears as a matter of course.

In consequence of this fact being so universally noticed, some practitioners have directed their views to salivation as the sole indication of cure, and have boldly prescribed calomel alone in doses of one scruple twice or thrice a day.

"I myself," says Dr. Robertson, "have employed the scruple doses in the dysentery of the western hemisphere, and have seen it, in the great majority of instances, produce all the benefit which Dr. Johnson taught us to expect. It deserves to be remarked, however, that it is a practice only adapted to tropical climates, for *there* the human frame is much less susceptible of the action of mercury, and consequently will bear much larger doses of that metal than it would be prudent to prescribe in the climate of this country."

I frankly admit, indeed, that the first stage of dysentery cannot be treated on principles too strictly antiphlogistic; but I contend, that when the second stage has commenced, or, in other words, when the previous increased action has ended in congestion, nothing can be more useful than

to saturate the system with mercury. This mineral does more to resolve irritative fever, to equalize the circulation, disgorge the capillary vessels, restore the balance of the nervous power, and open the sluices of the various healthy secretions and excretions, than any other remedy with which I am acquainted. Besides, it should be remembered, that calomel is a restringent as well as a cholagogue, and that its efficacy consists as much in restraining and rectifying the biliary and intestinal secretions, when they are excessive or morbid, as in exciting and augmenting them when they happen to be torpid or too scanty.

" The propriety of impregnating the constitution," says Dr. Robertson, " then being admitted, the only question of importance is, how is it to be done most speedily?" I answer with confidence, says he, " By means of calomel, in scruple doses, night and morning." " We should recollect, that the cases to which alone this practice is applicable, are pregnant with great distress and danger, and that, consequently, delays are dangerous. Nothing but the most energetic practice will prove available to save life, and *that* even, in too many instances, fails. Upon the whole, deferring to Mr. Bampfield's judgment and experience, but, at the same time, abiding by my own, I must take the liberty to declare, that I consider all his fears about excessive salivation, hypercatharsis, and so forth, as the results of this new practice, to be entirely illusory. His opinion that, ' the induction of salivation is incompatible with a high degree of inflammation,' not only takes for granted the correctness of his own theory of dysentery, but is in itself, perhaps, little better than an hypothesis. Besides, it carries no weight with it as an objection; because, where is the practitioner that would proceed to mercurialize the system until he has reduced the existing febrile excitement? Neither myself nor Dr. Johnson has ever administered scruple doses, or any other doses of calomel, with an attempt to salivate, without premising active depletion, both by bloodletting and purgatives."

His chapter on chronic dysentery is chiefly valuable on account of the clearness and earnestness with which he points out the necessity of dietetic restrictions, as auxiliary to the medicines employed. He details several very illustrative cases, where irregularities, whether in eating or drinking, brought on fatal relapses.

" The evil and mortal consequences resulting from intemperance, imprudent indulgences of the appetite, and of the social disposition, have been depicted in treating of the variety A: these errors are more pernicious in this, and the necessity of a most regular and temperate life, and of a strict dietetic regimen, is consequently greater. Obstinate or ill-fated patients are sometimes met with, who cannot be persuaded, or induced by sufferings, to a proper diet. I have sometimes eluded the bad effects of their folly and obstinacy, by keeping up a slight mercurial soreness of mouth, which has compelled them to relinquish solid food, and to live on broths and farinaceous preparations of diet, so long as to allow of a favorable state of

quiescence to the bowels, and to admit of the establishment of a healthy action of the ulcer in the intestines. We have no indirect means of adroitly warding off the fate of the determined inebriate, and can only succeed by resolute compulsion."—p. 242.

Perhaps the most original portion of the volume is the part that treats of scorbutic dysentery. I read it with very great pleasure, and give Mr. Bampfield the highest praise for the number of curious, instructive, and interesting facts which he has collected on the subject of scurvy. Yet I have doubts as to the correctness of his nomenclature, when he speaks of *scorbutic dysentery;* I indeed suspect that it ought rather to be considered an accidental co-existence of the two diseases in the same subject, than a distinct and specific variety of dysentery. This, however, is in a great measure matter of opinion.

He relates some singular cases, where scurvy appeared in the men in a week, or less, after putting to sea; and others, where the sea air was the only obvious cause. The pathology of scurvy is still very obscure, notwithstanding all the experience of the late war; that neither salt meat, sea air, nor atmospheric heat is indispensably necessary to the production of the disease, is proved by what Dr. Gregory relates of a family that came under his observation, who suffered severely from scurvy, during a season of dearth, in consequence of their chief diet having been tea. They had used it three times a day.

Notwithstanding my objections to some of Mr. B's. doctrines, I entertain a high opinion of his work. The talent, learning, and sagacity it displays will render it a rich treat to those who are fond of a well-written and well-digested treatise on this fatal disease. To them I conclude by recommending it.—*Med.-Chir. Journal, Vol.* 1.

On Dysentery, its Forms and Consequences, in Warm Climates, especially in India. By James Annesley, Esq.

[Analysis.]

We need not advert to the importance of a malady which forms the prominent feature of tropical diseases, and carries off more Europeans than any other form of disease whatever. The author treats first of the simpler or less complicated forms of dysentery—then of that variety which is characterized by attendant hepatic disorder—and, lastly, of the chronic forms, and on scorbutic dysentery.

SECT. I.—ACUTE UNCOMPLICATED DYSENTERY.

Collections of excrementitious matters, Mr. A. thinks, form one of the earliest pathological states which give rise to acute dysentery, by irritating the mucous membrane, and inducing inflammation, followed by ulceration and even sphacelation, if the case be neglected.

" In a great many cases, this form of dysentery is preceded by a constipated state of the bowels, often of long duration, especially among persons who have recently arrived in India. To this condition frequently supervenes mucous diarrhœa, attended with pains of the abdomen, coming on at intervals, and generally preceding the alvine evacuations. This form of diarrhœa may continue for two or three days, passing gradually into dysentery, with all the characteristic signs of the disease. In a few instances, especially when the evacuations are copious, the diarrhœa subsides, and the patient recovers without experiencing, at least for that time, a true dysenteric attack. This result seems to arise from the irritation produced upon the mucous surface of the large bowels by the fæcal accumulations having subsided, in consequence of the irritating matters having been removed, and of the copious secretion which had taken place.

Frequently, the dysenteric symptoms are present from the first hour at which the patient complains, the stools being then scanty, mucous, streaked with blood, and attended with abdominal pain and tenesmus. In cases of this nature, the increased action of the muscular coats of the bowel, especially about the sigmoid flexure and rectum, prevents the passage of the fæcal collections through their canal, and, in many cases, occasions a complete obstruction, little passing away but the perfectly fluid secretions. In cases of this description, if the disease be not early subdued by decided treatment, sloughing of the mucous coat often takes place, followed by involuntary motions, when the fæcal accumulations at last come away, such parts of them, at least, as have been dissolved being washed off by the watery secretions poured out from the irritated vessels of the inflamed surface." 153.

Believing this form of dysentery then to be essentially an inflammatory disease, whatever its cause, our author takes occasion here to dissent from the late Mr. Bampfield in respect to the subdivisions of the disease which that gentleman adopted. " The mild, the severe, and the inflammatory varieties which he has marked out, are, in our opinion, nothing more than varying degrees of the same, or nearly similar pathological states, proceeding from the extent to which the inflammatory action may have *supervened*, from the susceptibility of the system to sympathise with the local disease, and from the peculiarity of individual constitution. There is no line of demarcation by which these varieties can be separated from each other in practice."

Viewing the acute and uncomplicated form of dysentery, then, as an inflammation limited chiefly to the cæum, colon, and rectum, Mr. A. proceeds to paint its various degrees of intensity, as presented in practice among recently-arrived Europeans, in older residents, and among the natives. We shall here introduce the description which he draws.

" Simple dysentery, in its least severe forms, generally commences with frequent calls to stool, the motions being scanty, mucous, gelatinous,

streaked with blood, and accompanied with pain and tenesmus. At first the pain seems chiefly limited to the rectum, occasional griping pains being only felt in the abdomen. The tongue is often but little affected, farther than being white and loaded; the pulse sometimes at the beginning not materially accelerated, but it generally soon becomes affected to an extent varying according to the habit of the patient and severity of the disease. If the disorder be not subdued in this early stage, all the symptoms become more acute; the pain in the abdomen increases in severity and is more constant, yet, in many cases, little or no pain is complained of, excepting at the time when the patient is passing a motion, although the stools are of the most morbid character, and the disease altogether of the most severe form. This, however, ought not to be imputed to the absence of inflammatory action; for the mucous surface of the cæcum, colon, and rectum, may be inflamed, and, indeed, in a state of ulceration, and yet but little uneasiness, even upon firm pressure of the abdomen, is apparently felt. This seems to be owing to the varying degree of excitability and sensibility with which the human frame is endowed, and, perhaps, to some modification in the condition of the diseased parts, beyond the detection of our unaided senses. Yet, in many cases, where pain is either entirely absent, or but little complained of, a sense of heat in the abdomen, especially in the course of the colon, is very generally felt. When this symptom is present, it ought always to be recognised as indicating the existence of inflammation of the mucous surface of the bowel. A similar inference ought also to be deduced from a sense of soreness in the abdomen. This symptom is very often present in all the stages of the disease, and always indicates great irritation of the mucous surface. It frequently accompanies the sensation of heat, or supervenes to that symptom.

As long as the disease is limited to the mucous lining of the large bowels, the patient seldom feels more than a sense of heat, or a dull aching pain, not increased on pressure, which he usually describes as being heavy, and shooting at times through the whole abdomen; but when the cæcum is minutely examined, pain, to a greater or less extent, is always felt, and perhaps, some degree of fulness, even when pressure over the transverse arch of the colon occasions no uneasiness. If the left side of the abdomen, beneath the ribs, be grasped in the hand, so as to embrace the descending colon and sigmoid flexure, pain is sometimes felt, but not always; but when the right side is similarly grasped, so as to press upon the cæcum in opposite directions, then pain is almost always complained of. If the practitioner takes the patient's report without further examination, in cases of this description, he will often be misled.

As the disease advances, the stools usually become still more frequent, the tenesmus more severe, the discharges of blood greater and often more intimately mixed with the matters evacuated, which gradually pass from a mucous, slimy, and gelatinous character, to a more watery appearance, of

a dark colour, with a muddy solution of feculent matters, and sometimes with considerable discharges of fæces. The urine is now, and often early in the disease, of a high colour, voided frequently, and attended with scalding. Sometimes complete strangury is present: this is owing to the intimate connexion subsisting between the urinary organs and the seat of disorder. The tongue becomes more loaded and excited; the pulse more accelerated; and the skin harsh, hot, and dry. Tormina also, and the straining, increase; the calls to evacuation become more incessant, especially during the night, when the general febrile symptoms also are augmented.

When the straining and tenesmus are very urgent, we may then consider the rectum to be very remarkably inflamed: indeed, we know not of an instance where such a state was not evident when these symptoms were present. If tenesmus be very severe, in any particular instance, and if the patient presents but little abdominal fulness or tension,—if he complains but little of tormina, or of heat and soreness in the abdomen,—if he can bear pressure without uneasiness being produced about the region of the cæcum and sigmoid flexure of the colon,—we may then consider that disease is chiefly seated in the rectum, and that the large bowel is comparatively exempt, or at least much less affected than the rectum. But although this inference may be drawn, especially if there be little constitutional disturbance present, we ought not to depend upon it with certainty, and we should never allow it to seduce us into the adoption of weak measures of cure.

We have often seen the most extensive ulceration in the cæcum and colon, and yet the patient had not complained of tenesmus, the rectum having been comparatively sound. And we have seen tenesmus to a great and distressing degree, the colon, throughout its extent, being, upon *post-mortem* examination, found little disordered, and the disease confined to the rectum. From these circumstances, therefore, we have, during the latter years of our practice, especially when tenesmus has been urgent, considered it merely as characteristic of disease of the rectum, although frequently an attendant upon dysentery, and treated it accordingly, whether it arose at the commencement of the disease, or during the advanced stages." 157.

We shall not follow the author in his remarks on dysentery as it affects the natives of India. In them, as might be expected, the disease assumes a lower or more asthenic form, though the appearances after death are nearly the same in both classes.

In simple acute dysentery, the number of calls to evacuate the bowels varies from ten or twelve, to thirty or forty times in the twenty-four hours —many of the stools being merely a small quantity of mucus and blood— some of them more copious, and consisting of various morbid secretions as well as excretions. These fluid motions rapidly exhaust the strength of the patient. These watery evacuations, Mr. A. thinks, are indicative of

" the lodgment of acrid matters in the bowels requiring to be removed by purgatives at the commencement of the attack." Of this we have some doubts. The author indeed tells us immediately afterwards, that, " in some cases, the disease seems to commence in the rectum, &c." The appetite is sometimes so little impaired in simple dysentery, that ulceration of the intestines has taken place before food was loathed. But food generally produces great uneasiness in the line of the bowels, even where the appetite is unimpaired. After a number of minute and rather tiresome observations on various phenomena presented by the disease in question, Mr. A. proceeds thus :—

" Besides the appearances of the stools already pointed out, there are others which are less constant, and which deserve notice. The evacuations are sometimes of a singularly variegated hue, consisting of a glairy mucus, mixed with a greenish, gelatinous substance, sometimes with pure bile, at other times with a muco-purulent matter, with large pieces of albuminous-like concretions formed upon the internal surface of the bowel and afterwards detached, and either with streaks of fluid blood, or with dark coagula, more or less intimately mixed with the other matters discharged. Blood is occasionally evacuated in very large quantities, fluid, and distinct from the other matters composing the evacuation : it then flows from the lower parts of the large bowels. When consisting of coagula, and of dark, grumous clots intimately mixed with the discharges, we may consider it as having proceeded from the upper parts of the colon, or from the cæcum itself. The discharge of pure blood sometimes takes place early in the disease, and continues to its termination in death ; but this intestinal hæmorrhage is seldom of a florid hue : it most frequently presents the venous character, and occasionally a dark-brown, muddy appearance, mixed intimately with watery, feculent, and offensive dejections. The copious sanguineous discharge may or may not proceed from an ulcerated surface. We believe that it most frequently exudes from the irritated mucous surface, and that the latter description of discharge is characteristic of ulceration, and occurs most frequently in persons who have neglected the state of their bowels, or who have indulged in the intoxicating liquors of India, which are so destructive to soldiers." 163.

The mucous membrane of the rectum or colon is sometimes detached, in the latter stages of the disease, and discharged per anum in a tubular form. Most frequently, however, these membrane-looking tubes are exudations of coagulable lymph thrown out upon the inflamed surface of the bowel. When dysentery has advanced to the most unfavourable stage, the stools are streaked with purulent or sanious matters, evidently proceeding from ulceration of the bowels. We pass over a great mass of cases, and tedious details that are spun out to an immeasurable length, when we come to a section on—

HEPATIC DYSENTERY.

This is a form of the disease remarkably prevalent in India: consequently, its nature and treatment are of the utmost importance. This species of dysentery assumes various forms—is sometimes acute, sometimes subacute—or chronic. The more acute forms are generally accompanied by an affection of the liver, and a highly vitiated condition of the biliary secretion—while the chronic forms are attended by abscess and other organic changes of that viscus. Mr. Annesley does not attempt an explanation of this connexion of hepatitis and dysentery, nor to the precedency of one in respect to the other. The two phenomena, indeed, are often so coeval, that it is difficult, or rather impossible to ascertain the priority of one or the other. While wading through many pages of heavy quarto, presenting loads of the most insipid verbiage, and where the everlasting word "*supervene*" occurs in almost every sentence, we have been unable to find a passage to extract, or matter for condensation in our own language. What could infatuate Mr. Annesley to dilute his facts with such an ocean of words?

"In many cases of hepatic as well as of simple dysentery, the patient presents, for a day or two, many of the symptoms particularized in the section on the premonitory signs of disease contained in the First Volume of the Work, page 209. But this is not uniformly the case. The countenance is often pale, the skin cold, with horripilation, sickness, and loss of appetite, and a disordered, costive, and irritative state of the bowels. The patient often, at the same time, complains of a sense of chilliness, coldness or uneasiness in the back of the lumbar region, running down the sacrum, sometimes as far as the anus, with griping pains through the abdomen. These symptoms, however, seldom fall under the observation of the practitioner, unless he makes it a duty to inquire particularly into the condition of the men under his charge during health; for it is not generally until the phenomena pathognomonic of simple or complicated dysentery are fully developed, that medical advice is sought after. In those cases of hepatic dysentery in which the complication is immediate, or disease nearly coeval in both organs, the premonitory signs now noticed are often well marked, the griping pains extend through the abdomen and hypochondria, and are sometimes attended with vomiting, a sense of fulness and oppression at the præcordia, lowness of spirits, and slight dyspnœa.

At the commencement of this particular form of the disease, and generally following the above symptoms, the alvine dejections become frequent, and at first are usually copious, but morbid, both in colour, consistence, and odour. At this period they are very seldom either mucous or bloody, but they are generally very dark, crude, and offensive. As the disease advances, they vary daily, but are generally green, bottle-green, greenish brown or black, mixed with venous blood; sometimes slimy and watery, with a

greenish frothy slime on the surface; rarely clay-coloured, and not infrequently, especially in the advanced stage of the worst cases, reddish brown, ochre-like, or consisting chiefly of water, with blood more or less intimately diffused through it. The motions vary in frequency and in character, according to the stage of the disease and the treatment adopted. There is generally urgent tenesmus present, with scalding of the anus, and often *prolapsus ani*. The calls to stool are more frequent during the night, and attended with more or less irritative fever and restlessness. Sometimes the blood is so very intimately mixed with the other matters forming the alvine evacuations, that it must have proceeded either from the superior portions of the alimentary canal, or from the liver itself. But this is an appearance observed chiefly in the far advanced stage of the disease, when also the evacuations often resemble the washings of raw meat, and present nearly similar characters to those marking the last period of the simple form of the disease. The urine is generally in very small quantity, high-coloured, muddy, and evacuated usually with pain and difficulty.

In addition to this state of the alvine excretions, the patient generally complains of a fixed pain, weight, or uneasiness, in the pit of the stomach, increased on pressure, and frequently extending to the right hypochondrium, and beneath the right scapula. There are usually also present tension, and a sense of pressure at the hypochondrium, with anxiety at the præcordia, fits of dyspnœa, occasionally pain in the right shoulder, or in the chest, with a dry, teasing cough, headach, giddiness, sickness at stomach, sometimes vomiting, and great depression of spirits. The pulse is generally accelerated and irritable, especially towards night.

The appearance of the tongue is various in different stages of the disease, and in different cases: in the early stages it is generally white, excited, and covered with a yellowish fur. As the disease advances, the tongue either becomes dry, clean, smooth, red, and lobulated, or excited, dry, and covered at the root particularly with a dark crust. The skin is sometimes dry, harsh and of a dirty appearance; occasionally it is covered with a greasy perspiration, and copious sweats often occur through the advanced periods of the disease. There are also frequent thirst, and great desire of cold fluids. In other respects, the progress of hepatic dysentery is much the same as the simple form of disease already described; but it presents, in general, a greater range or variety of phenomena in different cases, and even in the same case, in different stages of the malady." 209.

In the more chronic examples of hepatic dysentery, as connected with abscess, the matter not seldom finds its way into the alimentary canal, through adhesions previously formed—or perhaps through the ducts themselves.

"The symptoms of the chronic forms of hepatic dysentery are more mild: tormina and tenesmus are not severe, if at all complained of. Little or no pain is felt, even upon pressure, in the course of the colon;

but the alvine evacuations are always more or less unnatural, and present appearances either of a morbid state of the bile, or of a deficient or obstructed secretion of this fluid. The calls to stool are also not so frequent as in the acute cases; but there are present great debility, depression of spirits, and sinking of the powers of life, particularly in those who have been addicted to intoxication.

In cases of hepatic dysentery, a dirty appearance of the skin, sallow cast of countenance, attended with an expression of anxiety and great depression of the spirits, are very generally present, and may often be relied upon as evincing disease of the liver, even although pain, weight, and tension at the epigastrium, præcordia, right thorax, and hypochondrium, may be wanting. The presence, however, of these latter signs, in addition to the former, and to the symptoms described as characterising the progress of simple dysentery, is distinctive of the associated disease of both organs." 211.

Under the head of Etiology, Mr. Annesley presents us with some documents indicative of the terrible ravages which dysentery occasions among European sojourners in tropical climates. Thus we find that, during a series of years, when the troops were not actively employed in the field, the annual rate of nominal admissions in hospitals (Bengal army) was 35 per cent. of the effective strength, while the annual rate of mortality was $5\frac{1}{2}$ per cent. in the nominal admissions. In the Madras army the rate of mortality was 8 per cent. though the rate of admission was only 27 per cent. Malaria and atmospheric vicissitudes are looked upon, and no doubt, with justice, by Mr. A. as the chief agents in the production of dysentery, with intemperance and some other causes as auxiliaries. We must pass over a great mass of observations on the etiology of dysentery, which might be useful in an elementary lecture on the subject, but would be misplaced here. They are deserving of attention among those who reside in the East, though few of them can have access to the work, on account of its price and size. We must now proceed to a subject interesting to all classes of our readers.

POST-MORTEM APPEARANCES.

In those cases where the termination is rapidly fatal, sphacelation of the mucous membrane of the colon is generally observed, with portions of the same inflamed, or ulcerated. Without insisting that inflammation is the primary link in the morbid chain, Mr. Annesley maintains that it is a sine quâ non in the complete establishment of the disease.

" It is extremely probable that the inflammatory action has been occasioned by some irritating cause lodged in the *prima via*, inducing simple irritation, in the first instance, of the capillary vessels and exhalants of the mucous coat of the large bowels, or by other causes acting upon the

body from without, and producing a determination of the circulating fluids to the same situation, and a similar condition of the vessels; but in whatever way it may originate, there can be no doubt that inflammatory action is, in the acute form of the disease especially, almost coeval with the dysenteric character of the stools; and the treatment which is founded upon this view will generally be the most successful in combating this disease as it is observed in warm climates. But whether dysentery originates in simple irritation, attended with increased exhalation, and terminating in acute inflammation of this surface from the commencement of the disease, is a question which cannot be solved by *post-mortem* examinations. Both these pathological states may be present in different cases, and may depend upon the causes producing the disease, and the constitution of the individual affected: from their nature they may be expected to produce analogous symptoms, and such as we observe generally to characterise the commencement of dysenteric affections.

Upon opening the abdomen of fatal dysenteric cases, the first object which generally attracts attention is the state of the omentum. This part is frequently inflamed, owing evidently to the extension of the inflammatory action to the peritoneal surface of the large bowels, and thence to this part. Sometimes it adheres, through the medium of coagulable lymph, to the more superficial convolutions of the bowels, at other times to the anterior part of the brim of the pelvis, or even to both: more frequently it is drawn up irregularly to the arch of the colon, and occasionally it seems wrapt close up to this part of the large bowel. Sometimes it is drawn to one side, and adheres both to the colon and to the abdominal parietes. These appearances are the more marked, if the ulcerations in the large bowels, which we shall have immediately to describe, have perforated the bowel, so as to occasion the extravasation of its contents into the peritoneal cavity, thereby producing general peritonitis; and when the dysentery has been complicated with hepatic disease.

With respect to the external appearances of the large bowels, it will be necessary to premise a few remarks before we proceed to describe the state of their internal surface. Sometimes these viscera present no external marks of disease to a superficial observation, and yet they will be found extensively disorganised when laid open. We suppose that it has been owing to their apparently healthy condition externally, that we so frequently have been furnished with accounts of a natural state of the large bowels having been observed in dissections of fatal cases of dysentery. The inference, to our minds, upon reading such accounts, is, that the individuals who furnished them have not inspected the seat of the disease which they had been attempting to investigate. Even when the colon is not remarkably diseased in its external surface, it generally presents one or more of the following states:—It is usually more or

less distended with flatus. The colour of its surface is various in different cases, and the shade different in different parts of the same bowel. Upon grasping the viscus, and running the fingers along it, a different feeling is communicated to the touch in distinct parts of it: at one place it is thickened and doughy, in another, thin and membranous. In one part the general shade of colour externally is a bluish-grey; in another, a greenish-blue: in one case it is verging to purple; in another it is pink: sometimes it is obviously inflamed in its serous covering, the capillaries distended with blood, running in all directions, and forming a close reticulum in its surface: occasionally the colour of the surface is quite natural, and the peritoneal covering possessed of its natural diaphanous appearance.

The shades of colour presented by the cæcum and colon externally, although frequently depending upon, or having some relation to, the states of the internal coats of these viscera, yet sometimes have no such dependence: thus we have observed, in cases where the peritoneal surface was the most pale, the internal or mucous surface of the bowel was most deeply diseased, of the darkest colour, and either sphacelated or extensively ulcerated. In other cases, where this viscus was externally of the deepest colour, varying in some parts from a brick-red to a reddish-brown or deep purple, the internal surface has sometimes presented less than usual marks of disease in those situations. Hence although the colour of the bowel externally may frequently depend upon the state of disorganization existing internally, yet no such connexion should be necessarily expected.

Displacements, elongations, and unnatural convolutions of the colon, are not infrequently observed in dissection of dysenteric cases. These have been already noticed; but we may further observe, that they are generally connected with some degree of relaxation of the longitudinal bundles of fibres which draw the colon into a sacculated form when in a state of contraction, so that the bowel in those states seldom presents many of those deep circular folds which form its cells; or they exist only in a small degree. In the majority of cases wherein displacements or elongations of the colon have been remarked by us, its peritoneal surface has been inflamed in parts, particularly that portion which was displaced. This is shewn in several of the Plates, where coagulable lymph may be seen covering the displaced portions, and connecting their surfaces either to each other or to adjoining parts, and sometimes to both. Amongst the most frequent displacements of the colon remarked, are,—first, a loop of the sigmoid flexure descending low into the pelvis, close to, sometimes adhering to, the urinary bladder and rectum, and explaining the disorder of the urinary function remarked through the progress of the disease; second, the descent of the transverse arch of the colon,

generally towards the right side, nearly as low as the pubes, as represented in the Plates." 259.

Sometimes the cæcum and colon are distended with fetid flatus, and the calibre of the bowel every where increased. In many cases, however, the distentions are partial, and there are many constrictions. The constricted portions are sometimes very limited, and appear as if a ligature had been tied round the gut—in other cases they occupy a considerable extent.

"The constrictions in some cases seem to be chiefly the result of a spasmodic action of the circular fibres of the part affected, owing to the irritation and inflammation of the internal surface. In other cases they seem to be of a more permanent nature; although most probably at their commencement they were the consequence of spasm. When the parts contracted are also found externally inflamed, thickened, and hardened, and in a semi-cartilaginous state, as they frequently are in the more chronic cases, their nature cannot be mistaken; and they must be viewed as one of the results of a slower state of inflammatory action, or of acute inflammation terminating in the chronic form; they are also very often the effect of repeated attacks of the disease. Sometimes the constricted portions of the bowel are remarkably inflamed externally, and occasionally they present in the peritoneal surface no very evident appearance of inflammatory action; although, internally, both inflammation and its consequences are present to a great extent. The narrow constrictions, as if from a ligature, are those which least frequently offer an inflamed appearance externally.

When the constrictions tend nearly to efface the canal of the bowel, the part above is usually much distended, and in some cases the coats of the distended portion are lacerated, and the contents of the bowel effused into the peritoneal cavity. The laceration seldom takes place in a sound part of the bowel; it generally occurs, or at least commences, in a part which has been ulcerated internally, and softened by the existing inflammation. The laceration of the distended part of the bowel is mostly soon followed by the death of the patient, but seldom before evidences of general inflammation of the peritoneal surfaces have been produced by the effused matters, and the bowels are glued together by coagulable lymph; and albuminous exudations, with a turbid serum, are poured out into the abdominal cavity. Sometimes the lacerated portion of the bowel is situated below a constricted part. When this is the case, there is always found a still more constricted portion below the laceration, which is situated in a more or less distended part of the bowel; although, after the laceration has taken place, the extent of the previous distention cannot be ascertained. In addition to the contractions and constrictions of the colon, the parts thus diseased may be still farther deranged: they

may be very closely adhering to adjoining viscera, or pressed upon by parts morbidly distended; or they may form very sharp turns and convolutions, tending still further to obstruct their canals; or they may be encumbered by large effusions of coagulable lymph upon their external surface, forming bands or artificial ligatures in the processes of condensation and adventitious organization, which these effusions often experience when life is prolonged for any considerable time after they first take place. Similar appearances are also observed in respect of the distended parts of the bowels, as shewn by several of the Plates accompanying this Volume." 261.

When the inflammation of the mucous membrane has proceeded so far as to implicate the peritoneal covering, post-mortem examination discloses great vascularity of the latter tunic, sometimes amounting to a purplish hue, with agglutination of the adjoining surfaces, and of the intestines to the liver and other contiguous organs. We now revert back to the state of the internal surfaces.

" In almost all cases of ulceration of the large bowels, the parts ulcerated are softened or more friable, so that they are readily torn upon forcible extension; and if the parts situated between the ulcerations be inflamed, as they generally are, they are also lacerated with ease. Want of the cohesion characteristic of healthy textures seems to be generally present in nearly all instances of the disease accompanied with acute inflammation, or any of its consequences.

Besides the general appearances characteristic of inflammatory action, or resulting from this state, which we have now described, the coats of the large bowels seem much thickened. This is particularly observable in the subacute and chronic cases of the disease. A certain degree of tumefaction or fulness of the inner coats of these bowels seems to depend upon the inflammatory state, and to arise from the general injection of the vessels, and effusion of fluid in the cellular tissue connecting their various coats. A thickened condition of the large bowels is, however, not uniformly remarked: in some few cases their parietes seem thinner than they are even in the healthy state, and are, at the same time, ulcerated to a greater or less extent. Occasionally, one part of the viscus is evidently thinner than natural; whilst another portion is much thickened and as if corrugated, as in Plate XXXIV. fig. 1.

The colour of the internal surface of the large bowels varies very much in different cases, as well as in the same case. In some it is of a very deep red, streaked transversely, and dotted in parts with a darker tint; the edges of the deeper ulcers, and the centres of those in the incipient stages, being of a still darker colour. Sometimes, intervening between large portions of deeply inflamed and ulcerated colon, the mucous surface presents a pale greenish-yellow hue, with or without small specks of ulceration, as in Plate XXXVIII. Occasionally the intensely red colour is variegated by

the different shades presented by the slight duplicatures and corrugations of the mucous surface of the bowel, and gradually passes into a yellowish or vermillion-red, and thence into a darker shade, indicating the transition to the sphacelated state, as shewn in Plate XXXIII. In some cases, nearly the whole of the mucous surface of the cæcum and colon is of a greenish hue, and presenting every depth of shade, from a pale grass-green to an olive colour; in some parts the deeper shades of green are interspersed with patches of a fine rose colour: in these latter the mucous tissue possesses its natural organization, whilst, in the former, its cohesion and structure are entirely destroyed, and it is in all respects in the first stage of gangrene." 266.

Our author remarks that, in the complication of hepatic disease with dysentery, in hot climates, " the association of structural changes of the liver with disorganization of the large bowels is constantly observed." It would be very strange were it otherwise. Mr. A. admits, what had been inferred by writers long before him, that the vitiated secretions from the liver are probably a material agent in exciting inflammatory action in the intestines.

TREATMENT OF DYSENTERY.

The rapid march of dysentery in hot climates requires rapid and active treatment; and in no disease is the utility of remedies, when early and judiciously employed, more conspicuous than in this disease. Unlike many maladies of temperate climates, dysentery is hardly capable of natural solution. On the contrary, it naturally tends to disorganization, if neglected.

The first indication, in uncomplicated dysentery, is to empty the bowels, and the second to guard against inflammation. The other indications are considered as subordinate.

" If the patient comes under our care when the premonitory symptoms of disorder are present,—when the bowels are first disordered, and he complains of chills, followed by slight flushes, coldness of the back and loins, &c.,—the exhibition of an ipecacuanha emetic, followed in a few hours by twenty grains of calomel, and this in two or three hours more by a purging draught and an enema, is often of the greatest benefit. At this time also the warm bath is of great service, by determining the circulation to the external surface of the body and taking off spasm, whilst the evacuating remedies directed to the *prima via* unload it of those accumulations which are so frequently instrumental in producing the disease.

When acute dysentery is fully developed, and the patient complains of a sense of heat, burning, soreness, pain, tormina, &c. then depletion is absolutely requisite, and the sooner it is employed after the supervention of

those symptoms, the more likely is advantage to be procured from it. The above symptoms are sufficient of themselves to require its adoption, if the pulse be but little accelerated and the patient not plethoric; and if he have been resident for a considerable time in the climate, local depletions, followed by hot fomentations or warm poulticing, when the leech-bites have ceased to bleed, will generally be sufficient. Depletion to a great extent, or at least to a sufficient extent, may be practised in this way. But if the patient has recently arrived from Europe, if he be of a full habit, if the pulse be full, hard, and irritable, if the tormina be violent, and pain fixed and increased on pressure,—a full bloodletting from the arm should always precede the application of leeches to the abdomen." 273.

The repetitions of bloodletting must depend on the judgment of the practitioner. In addition to depletion, general or local, Mr. A. endeavours to procure free evacuations from the bowels. "With this view, 20 grains of calomel, combined with one or two of opium, should follow the first depletion, and, a few hours afterwards, a purging draught, assisted by an injection, should be administered. The previous exhibition of the calomel and opium allays the irritability of the stomach, if this symptom be present, removes spasm, and prepares the morbid secretions of the liver and bowels for removal by means of purgatives, which are to follow." By the above passage, it will be seen that the plan laid down twenty or thirty years ago by writers on tropical climates, and by the Editor of this Journal in particular, continues to be the standard practice up to this hour. The above plan is almost verbatim et literatim what was acted on during the late war in India, and with the best success. We do not quite agree with Mr. Annesley, however, in his inveterate desire for purgation in dysentery; because we are very far from believing that the retention of fæcal matters in the cells of the colon constitutes the sole, or even the principal cause of the tormina and other phenomena of dysentery. Nevertheless, the plan pursued by our author will be generally successful; because the exhibition of the calomel and opium previously to the purgative, corrects any bad effects that might result from the purgative plan if pursued by itself. Tepid and warm bathing, after the antiphlogistic measures, is an important auxiliary—as are blisters and local fomentations to the abdomen.

"In the far advanced stage of the disease, after the above measures have been employed without deriving from them those advantages which they are calculated to afford, and generally do afford; or when the patient has been neglected or injudiciously treated at the commencement of the malady, the existence of ulceration of the large bowels, either in its incipient or farther advanced stages, should be dreaded; but we ought not on that account entirely to despair of the recovery of the patient, although an unfavourable termination is more likely to supervene. We have known many cases of recovery wherein the symptoms clearly indicated the existence of ulceration; and even after large portions of the mucous surface of the large bowel had

been detached and evacuated with the discharges. Until unequivocal signs of approaching dissolution are present, our means of cure should be administered zealously and unremittingly, and be judiciously selected and applied, according to the symptoms which may supervene.

At this period of disorder, the warm bath; blisters over the abdomen; emollient, mucilaginous, and anodyne enemata; small and frequently repeated doses of Dover's powder; injections of the infusion of ipecacuanha with opium, or of a weak infusion of bark and rhubarb; warm poultices over the abdomen; the use of the diaphoretic mixture already noticed; the infusion of catechu given internally or as an enema; and camphor, with ipecacuanha and opium, are often very serviceable. When there is evidence of morbid secretions and fæcal matters still remaining at this stage of the disease, a full dose of calomel and opium may be given at bed-time, in addition to the employment of some of the above remedies, and followed early in the morning either by a full dose of the compound jalap powder taken in aromatic water, or of rhubarb and calcined magnesia. If either of those seem not to answer the purpose intended, a full dose of castor oil may be substituted for them." 283.

The treatment of hepatic dysentery does not differ, in any material point, from that which has been detailed above. There will be more need, however, of impregnating the system with mercury than in the simpler forms, in order to remove the hepatic disease. Upon the subordinate means of relieving particular symptoms in dysentery we need not dwell, as they naturally suggest themselves to every well-informed practitioner.

J. J.

XVII. Remarks on the Acute Dysentery of Bengal.

" In the treatment of no other disease, perhaps, has the baneful influence of exclusive medical doctrine been more fully exerted than in that of Dysentery."—Copland.

If dysentery and fever were diseases of uniform character, and having an uniform *cause* and *seat*, then they might, perhaps, be treated after an uniform plan; but a very slender experience of these diseases, especially as they prevail within the tropics, or even within the British Islands, shews this not to be the case; for although, in the instance now under discussion, some portion of the larger bowel is universally implicated, yet, either from the first, or during the progress of the disease,—for we cannot often say which—the lesser bowel, the liver, the spleen, the pancreas and mesentery, become also the frequent seats of morbid action, so as greatly to modify the disease, and likewise its right treatment.

In the dysentery of Ireland, Dr. O'Brien found "the liver diseased in one-half of the dissections, the spleen in one-fourth, the small intestines in two-thirds, and the colon and rectum in all." The pathology of our dysenteries, whether in Southern or Northern India, and as given by the best authors, sufficiently establishes that morbid action in this formidable disease is not confined here, any more than in Europe, to the course of the large intestine, but that all or most of the associated organs are found after death to be more or less deeply implicated, just in proportion to the extent and severity of the symptoms during life.

It appears to me that to a want of just consideration of these inevitable pathological complications must we ascribe the system of exclusive treatment so much reprehended by the author quoted at the head of this article, and the successive abandonment also, by the surgeons of fleets and armies, of every exclusive plan hitherto proposed, almost as soon as it has been tried.

A catalogue-raisonné of the principal treatment of dysentery, at different times and places, will best exhibit the limited views of some, and the comprehensive measures of the majority of authors, who influence modern practice:—

1622. Bontius:—bleeding—vomit of ipecacuanha and purge—the extract of saffron, "the anchor of hope"—fruit diet—emollient fomentation and enemas.

1760. Dr. Huck:—bleeding repeated according to occasion—purgatives—ipecacuanha and tartar emetic in repeated and full doses.

1768. Sir John Pringle:—bleeding—vomiting—calomel purges—ipecacuanha and opium.

1773. Dr. John Clark:—full emetic of ipecacuanha and tartar emetic,

followed by mild purgatives;—then ipecacuanha and opium in small doses.

1782. Mr. Curtis:—chiefly purgatives; in the advanced stage—small doses of ipecacuanha powder—astringents, &c.

1787-9. Dr. Moseley:—bleeding—antimonials—revulsion.

1791. Mr. Wade of Chunar: solution of tartar emetic and salts—anodyne and sudorific draughts.

1799. Sir Gilbert Blane:—bloodletting—vomit and purge at the beginning; then ipecacuanha, opium, and salts, followed by small doses of ipecacuanha.

1799. Lemprier:—acute dysentery—vomiting—mercurial and common purgatives, throughout the disease—warm bath and fomentation; chronic dysentery—calomel and ipecacuanha.

1799. Dr. Whyte:—extreme bloodletting—flannel roller—careful confinement to bed, the body being anointed with oil—no internal medicine.

1814. Dr. James Johnson:—bleeding—mercury in full doses—sudorifics, with occasional mild purgatives and anodynes—strict attention to diet and clothing—change of air.

1817. Dr. Robert Jackson:—during immersion in the warm bath, copious bleeding—"the sovereign remedy"—emetic of ipecacuanha and tartar emetic—mercury sparingly, with mild purgatives—antimonials—charcoal rhubarb and ipecacuanha in repeated doses—solution of acetate of lead and of charcoal in the form of enemata—change of air.

1817. Dr. W. Fergusson:—bleeding—small doses of calomel and ipecacuanha until the gums become affected—inunction.

1818. Sir George Ballingall:—acute dysentery—topical bleeding—purgatives—infusion of ipecacuanha—opium—warm bath and fomentations—enemata—blisters: chronic dysentery—calomel and opium.

1818, 1822. The Dublin Physicians—Epidemic Dysentery:—bleeding, general and local—calomel, antimony and opium combined—emetics—enemata—counter-irritation—warm-bath.

1819. Mr. Bampfield:—bleeding—cathartics—diaphoretics with mercurials.

1823. Dr. Latham:—after the failure of all the remedies common to European practice, including ipecacuanha, "calomel and opium became the settled practice."

1822. Mr. Annesley:—emetic of ipecacuanha, followed by full doses of calomel, smart purges, and warm bath—general and topical bleeding according to constitution and length of service in India—calomel and opium alternating with purgatives and enemata—ipecacuanha or antimony with opium, as a sudorific.

1832. Mr. Twining:—general and local bloodletting—simple ipecacuanha, with extract of gentian—purgatives.

1832-3. Dr. J. Smith, Edinburgh,—Epidemic Dysentery:—scruple

doses of calomel given short of salivation, "the more common measures having failed."

1833. Dr. Jos. Brown,—Cyclopædia of Practical Medicine:—bleeding, general and local, repeated according to urgency and aided by hot bath and fomentation—gentle laxatives—mercury as a subsidiary to general and local bleeding, and combined with simple or compound ipecacuanha powder—sudorifics—opiates—enemas.

1835. Dr. Copland, Dictionary Practical Medicine:—bleeding, general and local—mild aperients—cooling diaphoretics—opiates "after depletion"—blisters—ipecacuanha and opium.

Of the above list, the authors who speak most of their success are Bontius, Dr. Moseley of the West Indies, and Mr. Wade of Chunar; and on that account, a brief inquiry into their respective modes of treatment may prove of some interest.

Bontius's treatment is already mentioned, with his extract of saffron, "than which (I dare to say) a more excellent remedy was never discovered by mankind; and I am fully persuaded that it is the most perfect antidote against this disease, even when of a malignant kind." Dr. Moseley bled; but the operation appeared to him secondary to other measures. "Bleeding," he says, "being an operation of great consequence in the flux, the cure is generally begun with it, repeating it as symptoms authorize, observing only '*non quæ ætas sit sed quæ vires sint.*' After bleeding, a vomit of ipecacuanha is to be given, and then an opiate after its operation is necessary. This is to be followed by a careful, continued course of them (antimonial wine and laudanum combined) to keep up a sweat in extent proportioned to the violence of the disease and not the trifling way of giving them in small doses, whilst the patient is exposed and their operation neglected. The Doctor goes on to relate that the eminent success of this plan was exhibited when the soldier had been suffering under "the worst condition of disease, with blood running from him, as in a hæmorrhage," and that before "several of the officers of different regiments in the West Indies who were desirous to be spectators of a fact so interesting to the army." He concludes this triumphant account by exclaiming—"such is the power of *revulsion.*"

The power of revulsion is no doubt great, whether effected by agents exhibited internally or externally. I remember, when in Ava, hearing of a British merchant, who being detained prisoner in Amerapoora under circumstances of barbarous severity, was seized with dysentery. After several days of unmitigated suffering, and when death appeared to him near and certain, an order arrived for the removal of the prisoners, to a place of closer confinement, where they were literally packed together. This state, which at first appeared so dreadful, threw him into a violent *perspiration,* and from that moment all symptoms of disease left him.

Mr. Wade is still more to the satisfaction of such as would follow exclusive plans of treatment, for he claims a degree of success—a chain of success, unbroken except by " two cases of unfortunate termination in the treatment of about four hundred cases of fever and dysentery."

The treatment for both diseases was alike by solution of salts and tartar emetic, with anodyne and sudorific night draughts. Mr. Wade says, " that the medical world may draw their own comments on the cases which are submitted to their examination. The person who has treated and compiled them shall defer his, until the public may have formed some unbiassed opinion of them, he shall only venture at present to vouch for their authenticity." Dr. John Clark merely wishes to " present facts; but he must add that he has given bark to 150 fever patients in Bengal and other places in the East Indies; and of that number lost only one who took the medicine with perseverance."

He was equally successful in dysentery; for out of " a number of patients," he " lost four."

Now, this is just what has been related by every mere writer of cases and pretender to extraordinary cures, from the dawn of medical science to the present day; and it is a curious fact, well deserving consideration how it happens, and happen it always does, that those who in their day claim the greatest and most exclusive success in the practice of medicine, should, in after-times, be the least followed in their modes of treatment. The common causes of error in reasoning and practice, as respects this disease, are so well described by Sir James Macgrigor, that I cannot do better than present them in his own words :—

" My opportunities of seeing this disease have been no common ones. Rarely, I believe, has it fallen to the lot of an individual to see so very many cases of one disease in such a diversity of climate and situation.

In the 88th Regiment during the course of upwards of ten years, I saw the same man the subject of this disease on the continent of Europe, in America, in both extremities of Africa, and in India. Of late, it has afforded me not a little amusement to review my notes as well as my journals of practice in this disease, in all these quarters. * * *

I became convinced, in Alexandria, that, with change of country and climate, we had a different disease. This is one proof how improper, and how unsafe, it is for the practitioner of one climate to set down and describe the diseases of another. They only who have studied the same diseases, in various opposite climates, can fully comprehend the extreme absurdity as well as fallacy of this. From reasoning of any kind, we are incompetent to decide on the identity of disease. Reasoning from analogy here always deceives. In many of the symptoms diseases may agree; but, from thence to infer their identity is taking a very narrow view."—*Medical Sketches.*

It only remains to notice the prevailing treatment of the dysentery, of

Bengal, amongst the more experienced practitioners at the Presidency, and this I shall insert in the order of importance. Bloodletting, general and local, as first practically urged in the dysentery of India by Dr. James Johnson, takes the lead, and has done so for many years; it is the standard remedy; and I believe that when the subject comes early and freely under this treatment, and that the case is not complicated with hepatic congestion or other actual disease, little else than a few aperients and sudorifics will be required for the cure; but as in most cases of this formidable disease, as it appears within the tropics, the diseased state of the large intestines is essentially mixed up with general abdominal complications, other and important means immediately follow the bleeding; and of the first are those which act powerfully on all the secreting organs, internal and external,—such as calomel in full doses, with ipecacuanha, followed by the mildest laxatives—sudorifics—warm baths—enemata—hot fomentations—blisters—and other minor adjuvantia. I believe this to be the general course here, and I have seldom seen calomel carried the length of salivation; neither do I consider this degree of effect necessary to the cure. Some experienced practitioners have assured me, that antimony in combination with calomel, proved quite as efficacious as the ipecacuanha; but in my own practice I always preferred the latter.

When, after a few days, inflammation has been subdued by bloodletting, and intestinal irritation removed by the calomel, ipecacuanha and aperients; then recourse should be had to the milder measures, as a persistence in the stronger ones is no longer necessary or proper to the cure.

The late Mr. Twining, in his clinical work, advocates the use of simple ipecacuanha powder, combined with the bitter extracts, which plan he described as very successful. I am not aware that this system has been followed by any of the other practitioners of the General Hospital, where Mr. Twining officiated for several years; neither would it appear to be successfully imitated in the provinces.

Dr. Macnab, in a very judicious and practical report on the dysentery of the native soldiery of Hindustan, when serving in Bengal, says, that "blue pill with ipecacuanha and gentian proved a complete failure, as has generally been the case in my trials of it. Indeed, I much suspect that Mr. Twining overrated the value of this favourite remedy, and that he may have also miscalculated the anti-emetic properties of the gentian."

On Mr. Twining's plan of drastic purging, Dr. Everard says:—"Twining has certainly overpraised repeated strong purging. The Deputy Inspector General informed me that, in his tour of inspection, he found some cases which *had been dysenteric, labouring under one-drachm doses of compound jalap powder given daily at noon, which got well immediately on removing the cause.*"

Ipecacuanha has been a favorite remedy in the south of India for forty

years and upwards.* Dr. Whitelaw Ainslie, after an experience of thirty years, and an extensive practice amongst all classes of Europeans, says of this drug, that it "has no equal in simple dysentery, that is, dysentery not accompanied with hepatic derangement; in such cases, given so as even to produce daily a little vomiting, it has the happiest effects." This is an observation of great practical importance, and, I think, impresses a just discrimination in the use of this valuable remedy. In speaking of an experience now of twenty years, and an extensive range of observation of the disease as it occurs in hospitals and private practice in this city, also as it appeared amongst the troops serving in the unhealthy provinces of Orissa and Gundwanah, and in the army at Rangoon and Upper Ava, I should say with Dr. Ainslie, that it is alone in *simple uncomplicated* dysentery that ipecacuanha shows its best effects, administered as an *exclusive* remedy; that is, after bleeding and moderate purging.

In the hepatic form of dysentery—(no uncommon complication in Bengal, especially during the cold season)—calomel is absolutely necessary to the cure. I lately treated for this form of the disease a gentleman who had suffered much from the Batavian fever contracted at the capture of Java: he was bled generally and by leeches, followed by purgatives and sudorifics; but no amendment took place, and nothing was voided but mucus and blood. Two full doses of calomel and antimony were then given, which produced copious biliary discharges and immediate relief. A few doses of blue-pill with ipecacuanha, and mild purgatives, concluded the treatment. There existed in this case no enlargement of the liver, nor uneasiness on pressure: but there was a total absence of biliary secretion; and until that was restored, the other treatment afforded no relief. Another case of very severe hepatic dysentery requiring measures of great activity, was marred in convalescence by soup, taken contrary to my directions: the liver became as painful as ever, and the dysentery returned, requiring a repetition of general and local bloodletting, mercury, &c.; and that under circumstances of greatly reduced strength. I have seen many cases in which morbid action seemed co-existent in the liver and cæcum, and I would beg to call attention to the subject.

I believe that cases of hepatic complication, treated without mercury, frequently terminate in inflammation and chronic abscess of this organ.

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* Mr. Twining, always anxious to be "saved from the imputation of founding his opinions on facts collected by the industry of his professional brethren—a miserable expedient"—seems here to have been strangely unacquainted with the history and long-standing reputation, in the South of India, of his favourite remedy. He has thus, like many respectable practitioners, fallen into the error of supposing that what he observed was new, while in truth it was very old. After mentioning the very able officers, Mr. Geddes, Drs. Mortimer and Baikie, of the Madras Service, he concludes:—"In fact, ipecacuanha has been a favourite remedy with some of the medical men at the Madras Presidency." From the context it is evident that a very recent date is here meant.

When ipecacuanha is preferred, it is proper to ascertain the following circumstances :—

1st. Whether the bitter extracts have any and what effect in preventing vomiting under the use of this drug; for in extensive trials made by me, they have not appeared to have had any. It is true, that, after a few days' use, a comparative tolerance of the drug seems to be established, as in the case of the antimonial preparations; but this is altogether unconnected with the use or disuse of the bitter extracts.

2nd. Whether four grains occasion as much sickness as twelve; and if so, whether the larger dose should not be preferred in the cure of dysentery. If the action of ipecacuanha be purely revulsive, or if, according to Paris, it be to abate both the velocity and force of the heart's action, so as to affect "the whole series of bloodvessels from their origin to their most minute ramifications," we should perhaps do wrong, in such a formidable disease as dysentery, to be sparing of our dose, if the stomach can be made to bear the larger quantity. The subject is important, and worthy the further consideration of the profession.

The range of observation in years, for the East Indies, is limited in the accompanying table; but it is interesting, as shewing the relative frequency and intensity of the disease in various countries. It was prepared under direction of Major Tulloch :—

STATIONS.	Period of Observation.	Aggregate. Strength.	Dysentery.		
			Attacked.	Died.	Proportion of deaths to admissions.
Windward and Leeward Command	20 years ..	86661	17843	1367	1 in 13
Jamaica	20 ,,	51567	4909	184	1 in 26⅔
Gibraltar	19 ,,	60269	2653	64	1 in 41½
Malta	20 ,,	40826	1401	94	1 in 15
Ionian Islands	20 ,,	70293	3768	184	1 in 20½
Bermudas	20 ,,	11721	1751	36	1 in 48⅔
Nova Scotia and New Brunswick	20 ,,	46442	244	18	1 in 13⅗
Canada	20 ,,	64280	735	36	1 in 20½
Western Africa	18 ,,	1843	370	55	1 in 7
Cape of Good Hope	19 ,,	22714	1425	44	1 in 32½
St. Helena	9 ,,	8973	751	69	1 in 11
Mauritius	19 ,,	30515	5420	285	1 in 19
Ceylon	20 ,,	42978	9069	993	1 in 9
Tenasserim Provinces	10 ,,	6818	1460	137	1 in 10⅔
Madras	5 ,,	31627	6639	559	1 in 12
Bengal	5 ,,	38136	5152	411	1 in 12½
Bombay	5 ,,	17612	1879	151	1 in 12½

J. R. M.

XVIII.—Disorders of the Hepatic System.

Aspice quam tumeat magno Jecur Ansere Majus.—Martial.

I have more than once in this Essay alluded to a sympathy, or synchronous action, subsisting between the extreme vessels on the surface of the body, and those of the vena portarum in the liver; a sympathy which, as far as I am acquainted, has not been noticed by any other; and which, if proved, will account for the increased secretion of bile in hot climates, and lead to important practical conclusions. It is, however, in eastern climates, where the vessels in question are more violently stimulated than in Europe, that we can most easily and distinctly trace this sympathy. I have remarked, that when we first arrive between the tropics, the perspiration and biliary secretion are both *increased;* and that, as we become habituated to the climate, they both *decrease, pari passu.*

It is very singular that the accurate Bichat should not only have overlooked this circumstance, which is evident to the meanest capacity, but advanced a doctrine quite the reverse. "A cold atmosphere," says he, "confines the functions of the skin, and occasions those of the mucous system to be proportionally extended. The internal secretions are more abundant, &c." And again. "In warm seasons and weather, on the contrary, the skin acts more powerfully, and the secretions, particularly the urine, are diminished."—*Anatomie Générale.* This is all right, had he excepted the biliary secretion, which follows a law diametrically opposite to this; viz. it is *increased* by a warm, and *diminished* by a cold atmosphere, in the same manner as perspiration.

I have likewise shewn that in the cold, hot, and sweating stages of fever, the two processes are exactly simultaneous and proportionate. The *partial sweats* that break out towards the termination of the hot fit, are accompanied, as Dr. Fordyce remarks, with "*partial secretion,* and irradiations of heat arising from the præcordia." I shall now proceed to other examples illustrative of this sympathy. The Asiatic and African, though inured from their infancy to the high temperature of their respective climates, guard, nevertheless, against *excessive* perspiration, and its too frequent consequence, *suppression,* by keeping the skin soft and unctuous, whereby they maintain an *equable* flow both of perspirable matter and bile. The *former* is evident to the senses; the *latter* is proved by the regularity of their bowels, and their general exemption from bilious or hepatic diseases. "The use of oils," says Dr. Currie, "instead of clogging the pores, keeps the skin moist; and while it guards against *excessive,* promotes moderate and *necessary* perspiration."—279. In our own climate, the

gentle diapnoe, or insensible perspiration of *mild weather*, coincides with the regular biliary secretion; while it is in August, when the perspiration is most in excess, that we see cholera morbus, and greatly increased secretion of bile.

Bichat ascertained, by direct experiments, that, during the time of digestion in the *stomach*, the pylorus is closed, and the biliary secretion *diminished*. We know that a corresponding heat, dryness, and constriction on the surface of the body, are observable at this period. On the other hand, he found that, whenever the chyme began to pass into the duodenum, the biliary secretion was rapidly augmented. We know that, at this very time, the surface relaxes, and the perspiration is increased. Every one knows the effects of emetics and nauseating medicines on the skin and perspiration; the same effects are produced on the biliary secretion. "In all cases," says Dr. Saunders, "where bile is secreted in *too large* a quantity, the use of emetics is improper; indeed, the actions of nausea and vomiting *increase* its secretion."—p. 176. This sympathy is equally visible where the secretion is deficient.

If we observe these emaciated objects returning from the East and West Indies with indurated livers, sallow complexions, torpid bowels, and paucity of biliary secretion, we invariably find the skin dry, constricted, and harsh to the feel, without any thing like the softness and moisture of health.

In *diabetes*, where perspiration is notoriously defective, there is the most decisive evidence of diminution in the biliary secretion. "There are, perhaps, few cases of diabetes," says Dr. Watt, "without some affection of the abdomen, particularly in the epigastric region."—p. 47. "Some morbid change," says the same accurate observer, "in the alvine excretion *always* accompanies the diabetic habit. *Costiveness* is perhaps the *most common* of these. In some instances the bowels have been so remarkably torpid, that even the most powerful medicines, in uncommonly large doses, produced but trifling effect." And, speaking of Stevenson's case, he says, "the quantity of alvine excretion was inconsiderable; it had also an *uncommonly white* appearance."—These facts speak for themselves.*

In chlorosis, Dr. Hamilton observes that—"the perspiration seems to be checked"—and "I am persuaded," says Dr. Saunders, "that in chlorotic habits, the bile is more insipid—*is secreted in less quantity*, and of a paler colour than in health." p. 232. "In maniacal habits," continues the last-mentioned author, "there is generally a *defect* in the secretion of bile." I need not say how marked is the dry, rigid skin, and deficient perspiration, in most maniacs. "Sea-sickness," says Dr. Saunders, "and a sea-voyage, contribute very much to *restore the secretion of healthy bile*."

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* Are not the kidneys irritated by the non-secreted bile, (or rather the elements of bile floating in the circulation) into inordinate action, in diabetes? Are not the effects of bloodletting and mercury thus explained?

The well-known effect of these in determining to the surface, and promoting perspiration, especially that gentle diapnoe, corresponding with healthy secretion in the liver, need not be insisted on. The torpid state of the skin in melancholia, hypochondriasis, and most nervous disorders, exactly coincides with that of the liver and bowels in the same. "Hypochondriacal complaints," says Dr. Saunders, "are always attended with dyspepsia and diminished secretion, with great torpor of the alimentary canal."—192. And again, "the symptoms of dyspepsia and diminished secretion, which are now rendered more conspicuous among females, from their sedentary life, are most effectually removed by the means suggested," —viz. sea-sickness and a sea-voyage, the very surest means of keeping up a regular and healthy discharge from the pores of the skin.

The same may be said of exercise, which powerfully promotes the secretion of bile as well as perspiration.

There is a curious case related in the Edinburgh Medical and Surgical Journal, vol 2, page 5, where an obstinate dyspepsia (where bile is known to be deficient) could not be cured till the exercise (broadsword) brought on a copious flow of perspiration. In cases of deranged structure and deficient secretion in the liver, Dr Saunders recommends, what certainly will be found very useful—"the tepid bath, and small doses of mercury."

Here the bath must act first on the skin, and probably on the liver, from the sympathy in question—while, on the other hand, the mercury, which is known to increase the action in the liver, may produce its diaphoretic effect, from the same consent of parts above alluded to.

All the passions corroborate this doctrine. Fear, grief, and the other depressing passions, when moderate, lessen the secretion of bile—render the skin pale or sallow, and check the perspiration. On the other hand, anger and rage are well known to increase the biliary secretion; and their corresponding effects on the surface are visible to every eye. Joy, hope, and what may be termed the elating passions, when in moderation, determine to the surface, and keep up a salutary flow of bile and insensible perspiration, so congenial to the healthy functions of the body. I shall adduce no more examples, till I come to speak of dysentery and cholera, which will, I think, afford undeniable proofs of the sympathy in question.

In the mean time, this connexion between two important processes in the animal economy, while it fully accounts for the increase of action in the hepatic system, from the influence of a hot climate on the surface, will be found to elucidate many of the phenomena attending those diseases we are considering; and, perhaps, remove the stigma of *empiricism* so commonly attached to their cure.

It is allowed that perspiration and biliary secretion are increased by tropical heat, and that the latter is *vitiated*. Perhaps, even here the parallel holds between the two. How different is the profuse and gross evacuation of sweat, from that insensible halitus, or gaseous fluid, which just keeps the skin soft and smooth in health!

We know that Nature has recourse to the perspiratory process to obviate *greater* evils that would accrue from accumulated heat:—we have every reason to believe, from analogy, that the increase of the biliary secretion is also a wise mean employed by the same invisible agent, to guard against congestion, and derangement in the hepatic system.

I have shewn, from Dr. Currie, that even "the *necessary* quantity of perspiration in a hot climate enfeebles the system." So the increased and vitiated secretion of bile debilitates and renders irritable the whole tract of the alimentary canal. "The inhabitants of warm climates," says Dr. Saunders, "are extremely subject to diseases arising from the increased secretion of bile, and the excess of its quantity in the primæ viæ, which either, by regurgitation into the stomach, produces a general languor of the body, together with nausea, foul tongue, loss of appetite, and indigestion, or, being directed to the intestines, excites a painful diarrhœa, ultimately tending to weaken their tone and disturb their regular peristaltic motion."—p. 157.

As bile, especially when vitiated, is certainly apt to gripe and loosen the bowels, it might be supposed that, if it be increased with the cuticular discharge, those whose laborious exertions keep them every day bathed in sweat for hours, would be continually subject to diarrhœas. But Nature has admirably guarded against such an inconvenience, by establishing what may be termed a *vicarious sympathy* between the skin and the internal surface of the intestines, by which the secretion of mucus, &c. on the latter, is diminished, as the perspiration is increased. In temperate climates, therefore, and among the laborious classes of society, this increase of the biliary fluid is productive of little or no mischief, being all expended during the digestion of their food, which is generally composed of such materials as require strong organs and powerful fluids for that purpose.

But it is very different with Europeans in hot climates.—There the vicarious sympathy is not always able to keep in check the diarrhœa; and when it is, the superabundant secretion of bile accumulates in the primæ viæ, producing all the symptoms above enumerated, till its quantity or quality raises a commotion in the bowels, in consequence of which it is expelled. Hence the impropriety of attempting athletic exercises in the heat of the day between the tropics, which must greatly increase the ill effects described.

These, then, are the penalties (aggravated, indeed, too often by our own misconduct) which are incurred, more or less, by emigration from a temperate to a torrid zone! They are the mild inflictions, however, of Nature, wisely calculated, and providentially designed, to ward off more serious evils.—They must be continued long before they induce actual and dangerous diseases; and I am convinced we might, in general, escape the latter, by exercising our rational faculties in observing and rendering sub-

servient to our use, the simple, but salutary operations of Nature. After having been severely taught to feel the ills I am going to portray, it is still a most pleasing task to trace the wisdom and benevolence of our Creator in what might *seem* the imperfection of his works.

We now proceed to the more serious injuries too frequently resulting from these spontaneous, but salutary efforts of the constitution, when counteracted or goaded on by our own injudicious management, or by unavoidable accidents.

I have shewn, on the authority of Dr. Currie, that excessive perspiration occasions a loss of tone in the extreme vessels; in consequence of which, the perspiratory fluid continues to be poured out *after* the cause or necessity has ceased to operate. It is precisely the same with respect to biliary secretion. He has likewise observed that, in the last-mentioned state, the application of even a slight degree of *cold* is pregnant with danger. It certainly is so; and on more accounts than one. For not only is the animal heat too rapidly abstracted, but the extreme vessels on the surface, and likewise *those of the vena portæ*, are instantly struck torpid; the perspiration and biliary secretion are arrested; the passage of the blood through the liver is obstructed; and a temporary *congestion* throughout the portal circle is the result.

This view illustrates, and is, at the same time, confirmed by the observations of two physicians in very different and distant parts of the world. Sir James Macgrigor remarks, that during the march of the army over the sandy desert of Thebes, where the thermometer frequently stood at 118 in the soldiers' tents, the health of the troops was equal to what it had been at *any* former period in India. "Heat of itself, then," says he, "does not appear to be the *principal* cause of the prevailing diseases." It certainly is not; but when excessive and long continued, it induces that state of the vessels on the surface, and of the liver, which is easily thrown into disease by the sudden application of slight degrees of cold. This accounts for Dr. Moseley's paradox, that "*cold* is the cause of almost all the diseases in *hot* climates, to which climate alone is accessary." He refers the mischief here entirely to checked perspiration; but the connexion which I have traced between this and *internal* mischief, will more amply elucidate this affair. Thus, in the months of April, May, and the beginning of June, at Calcutta the heat is considerably greater than during the subsequent rainy months; but perspiration, though profuse enough, is steady and pretty uniform, and the principal diseases are those from increased secretion of bile. From the middle of June, on the other hand, the close, humid, and sultry atmosphere, is attended with an absolute exudation from every pore of an European's body; in which state the chilling application of rain—the raw, nocturnal vapours—or the atmospherical vicissitudes of Autumn, will produce, as may easily be conceived, the effects I have described above; the consequences of

which will be fever, dysentery, or both.* It is on this account that the Bengalese are observed to be more assiduous in using oily frictions at this period than at any other. They know, from experience, that by such precautions they are enabled to maintain a more *uniform* discharge from the pores, to check profuse perspiration by day, and to obviate the effect of rain or cold by night.

On the Coromandel coast, however, where the range of temperature is higher and more permanent; where the duration of the rain is short; where the nights are either hot, as during the hot land-winds, or temperate, dry, and clear, as at other times, the deterioration of the hepatic organs is slow and gradual, *where temperance and regularity are observed.* But among heedless sailors, soldiers, and others, who, to the stimulating effects of the climate, add inebriety, too much food, or ill-timed exercise, then the biliary secretion and perspiration are so hurried and augmented, and the vessels so debilitated, that the smallest atmospherical vicissitude becomes dangerous.†

The effects resulting from the application of cold under these circumstances, will be in all degrees from a slight shiver to a fever, or even instant death. We will suppose them only in a low degree. During the temporary torpor of the extreme vessels on the surface, and of the vena portarum, the pori biliarii and excretory ducts will partake of the same atony, and the bile will stagnate, till the re-action succeeds and propels it forward in its accustomed course, with a degree of acceleration proportioned to the previous quiescence. It is plain, that by frequent repetitions of this, the vessels and ducts in question will lose tone; and as atony is the parent of spasm, constrictions of the ducts must at these times take place; the bile will become viscid, occasionally from stagnation, and be with more difficulty brought forward into the intestines during the subsequent increased action of the vessels. Thus obstructions will form, and an inflammatory congestion be constantly impending, till time, or some accidental aggravation of the causes above-mentioned, kindles up Hepatitis, which will run rapidly into suppuration, and perhaps in a few days destroy both the organ and the life of the patient, unless it be skilfully checked in its career.

If, during this catastrophe, we expect to find the pathognomonic symptoms of acute hepatitis, as it appears or is described in Europe, we will be greatly deceived. In *comparatively* few instances have I seen the violent rigors, high fever, hard, quick, and full pulse, acute pain, &c. which we would naturally look for as preceding the destruction of such a large and important viscus.

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* Vide Section on Bilious Fever.

† See the Section on the climate of Egypt in the Mediterranean division of this work, where the foregoing reason is still farther elucidated, and confirmed.

Such cases, however, pretty frequently occur during the first twelve or eighteen months after arriving in the country. A young gentleman of great abilities, and a good constitution, but who despised all curbing rules of temperance or precaution, ran about in the sun for some days at Malacca, indulging in all sorts of licentiousness and inebriety; and was seized in a day or two afterwards, on our passage to China, with rigors and heat alternating; succeeded in a few hours by pain in the right side, extending across the pit of the stomach, accompanied with some difficulty in respiration. He did not send for me till twelve or fourteen hours after the attack. He had then high fever—hard, quick pulse—great dyspnœa—a short cough, and the most excruciating pain in the region of the liver. Although I had then been accustomed to treat hepatitis as it more usually appears in India, and this gentleman had been a voyage to Bengal in a Company's ship before he joined us, yet the disease had so decided a European character, that I determined on employing the European method of cure. Accordingly, blood was drawn, "*pleno rivo*," from his arm, and repeated twice the next day. His bowels were kept open with saline cathartics; and antimonials, in nauseating doses, were prescribed, to relax the surface, which was dry and burning. By these means the febrile symptoms were greatly mitigated, and blisters to the side seemed to relieve the local affection. He still, however, had great tenderness on pressing the right hypochondrium: and on the fourth day he complained of having a flux.

I knew but too well how sure an index this was of mischief going on in the liver. I therefore commenced the administration of mercury without delay. But while endeavouring to saturate the system with this medicine, we were overtaken by a most violent typhoon, or hurricane, in the Chinese seas, which kept the ship in the greatest agitation, and completely drenched with water, for many days together. I had reason to believe that he neglected at this time to take his medicines, and I was not able to pay minute attention to him myself. The flux was now the prominent symptom, and, though I used every exertion, I could never afterwards affect his mouth with mercury.

A fulness soon appeared in the right side; while the shiverings, cold sweats, and, lastly, the colliquative diarrhœa, that terminated the scene, left no doubt that abscess had not only formed, but burst internally. He dragged out a miserable existence of more than three weeks from the commencement, and died at the island of Lintin, where I inspected the body.

Before his dissolution, the discharge *per anum* was purulent, and dreadfully fetid. A few hours before his death he vomited a similar matter, and then sunk rapidly, retaining the possession of his mental faculties till the last moment; and regretting his inattention to the advice I had often given him, previous to his illness, warning him against the effects of intemperance and exposure to the heat of the sun.

On dissection, the liver was found one entire mass of suppuration and disease. I passed my hand from it into the stomach to which it adhered, and through which an abscess had burst. Another adhesion had formed between the liver and the transverse arch of the colon, through which was an exit also for the matter. In short, scarce a trace of healthy organization was to be observed at any distance from the convex surface of this organ, which part alone preserved any thing like a natural appearance.

I met with few cases in India so exquisitely marked with acute European symptoms as this. But in all those which exhibited traits at all approximating to the above, I delayed not a moment in commencing the mercurial treatment, *in conjunction* with the antiphlogistic; the *latter* being carried no farther than the inflammatory symptoms appeared to require; the *former* continued uninterruptedly till the full effect was produced, and till every shadow was gone.

Such instances as these cannot be mistaken; they can too often be traced to evident and adequate causes; such as intemperance—violent exercise in the sun—or sudden exposure to cold when the body has been some time in a state of perspiration. They will occur principally among those lately arrived from Europe, or at least within a year or two after their arrival; and such symptoms will be, in most cases, confined to the young, the robust, and plethoric habits.

But, in general, the disease makes its approach in a much more questionable shape, though equally pregnant with danger as the foregoing, and not seldom more rapid in its course. A man comes to us, complaining of having a flux. He says he is frequently going to stool—that he is griped; but passes nothing but slime—that his stools are like water, or some such remark. It is ten to one if he mentions any other symptom at this time. But if we come to interrogate him more closely, he will confess that he has had some soreness at the *pit of the stomach*, or perhaps in the right side. If we examine the part, a fulness will sometimes appear—if we press upon it, he starts back, or shrinks at least from the pressure.

If we look into his countenance, besides a certain anxiety, we will observe a dark kind of sallowness in his cheeks, and a yellowish hue in his eyes. The latter is seldom absent in hepatic diseases, both in India and Europe.

The temperature of the surface will probably not be much increased; but the skin will have a dry feel—his mouth will be clammy, and his tongue have a whitish or yellow fur towards the back part. His pulse, though neither hard nor very quick, will have an irritable throb, indicative of some internal affection. His urine, if inspected, which it always should be, will be found to tinge the bottom and sides of the pôt with a pink sediment, or to turn very turbid a few hours after it is voided; and he will generally complain of some heat and scalding in making water.

These are all the external marks we can perceive; and the few symp-

toms at the head of the list are all that the heedless soldier or sailor has noticed, or at least recorded. Happily for the patient, as well as his physician, the degree of violence in the bowel complaint, where other symptoms are not conspicuous, will be almost always a sure index to the rapidity or danger of that in the liver. Whereas, in those cases where the symptoms are of the violent or European cast—particularly pain, fever, and dyspnœa, the bowels are very frequently costive for the first few days of the complaint.

If it is not early checked, it will frequently run on to suppuration, like the case described, and then the chance of its pointing, or of the matter finding its way through ducts or adhesions, with ultimate recovery, is faint indeed. Other symptoms will occasionally arise in this disease, or accompany it from the beginning. Thus the fever is sometimes smart; the enlargement, hardness, or tenderness of the part, more violent; the inability of lying on a particular side may be complained of; a short cough may attend; or that particular sensation in the acromion scapulæ may be noticed, though it is not very often that this last is present.

These symptoms, and the duration of the complaint will vary much. Indeed, the latter is very uncertain; as its continuance may be protracted to several weeks, without suppuration or organic derangement of vital importance following.

This, then, is the hepatitis of India; and certainly there is no small dissimilarity in symptoms, between it and the acute hepatitis of Europe. The flux, which may be termed the pathognomonic symptom of the former, is almost always wanting in the latter. The one (Indian) partakes more of inflammatory congestion and obstruction; the other, of active inflammation, like that of the lungs, kidneys, &c.

Such are the marks that are to guide the practitioner when the disease is present. An attention to the following premonitory symptoms, described for the use of the more intelligent class of patients, into whose hands this Essay may fall, will probably save them many a nauseous dose, and many a tedious day's illness.

In all bilious diseases, the *mind* is much affected. When hepatitis is impending, it loses a portion of its wonted firmness. Our spirits are unequal; we are occasionally gloomy and irritable; and apt to see things through a distorting medium. This too frequently drives patients to have recourse to those very means which hasten on the fatal catastrophe, but which give a temporary relief to disagreeable mental sensations, that are only symptomatic of the corporeal affection—I mean, an indulgence in the fugitive pleasures of the bottle.

The eye and countenance assume the appearance alluded to before, termed Bombycinous by Dr. Darwin; and the urine becomes high-coloured, or tinged with bile; and almost invariably produces considerable scalding in its passage through the urethra. Dyspeptic symptoms arise, and gene-

rally mislead the patient into a belief that his complaint is only indigestion. After any thing like a full meal, we feel a most uneasy load and sense of oppression about the pit of the stomach, which are relieved by yawning, stretching, or standing up, and aggravated by stooping, or the recumbent posture. The digestion is never equal to the appetite, though the latter is often deficient;—and this leads to irregularity in the bowels. One day, there are dark, clayey stools, with costiveness; another, they are fetid and slimy, with flatulence and looseness. The skin has not the moist, soft feel of health; but often a dryness, with partial clammy perspirations, and irregular flushes and chills.

We may not feel, at this time, any pain on pressing the region of the liver; but a short and unexpected step on uneven ground will frequently cause a most unpleasant sensation at the pit of the stomach, or in the right side, as if something dragged there. Indeed, if the patient be attentive to his own feelings, some internal uneasiness will always be found to precede the pain on external pressure; at least, I invariably found it so in my own person, and it has more than once admonished me of my danger.—The same remark has been made to me by intelligent patients. Disturbed sleep, and frightful dreams, precede and accompany this disease, in almost every case. Nothing harassed me more than this unpleasant symptom; and on *inquiry*, I always found my patients make the same remark; but they will seldom mention this unless they are interrogated.

When all, or several of these symptoms, make their appearance, a few doses of calomel and cathartic extract, administered so as to keep up a regular increase of the alvine evacuations for some days, together with the strictest abstinence and caution in avoiding the extremes of heat, or sudden vicissitudes, will often anticipate the attack of this insidious disease, and entirely check it in embryo. If these means, however, do not remove the morbid train of premonitory sensations above described, mercury should be slowly introduced, so as to produce a brassy taste in the mouth, and kept at this point till the return of health and strength, which would hardly ever fail to result.

It will be readily understood, that the warning symptoms above-mentioned can only be expected where the disease is coming on gradually, from the effects of climate, and the more moderate application of such causes as hasten these effects. Where the *excitantia* are strong and evident, such as great intemperance; sudden exposure to considerable atmospherical vicissitudes, particularly to cold after perspiration; violent exercise, &c. then, the interval between them and actual disease, will not always afford many admonitory sensations.

TREATMENT.

The medical practice of India is more simple than that of Europe, evi-

dently from the great connexion which experience has traced between many *apparently* dissimilar diseases in the former country; rendering it only necessary to vary, in some degree, the same methodus medendi.

During the first twelve months after arriving in the country, whenever the patient was at all robust, the pyrexia evident, or the pain considerable, I bled at the very *commencement*, and not with a sparing hand. I did so with a two-fold view. One was to relieve the febrile symptoms, by lessening the inflammatory congestion in the liver and portal circle; the other, to lower the tone of the constitution, which, experience taught me, accelerated the effect of that medicine on which my principal reliance was placed. To further both these objects, one or two doses of calomel, or the pil. hydrarg. with opium and antimonial powder, were given after copious venesection, and followed by castor oil or jalap, which never failed to bring down a copious alvine discharge, consisting of any thing but natural fæces, or healthy bile. For, in the flux attending hepatitis, the violent straining and griping are succeeded by nothing but mucus and blood, accompanied by a distressing tenesmus, *unless* when laxatives are taken, and *then* diseased secretions only, with occasionally hardened scybala, or other fæcal accumulation, are passed.

It appears, by Mr. Curtis, that the hospital practice at Madras in his time (more than forty years ago,) was to give three grains of calomel, with some rhubarb and soap, night and morning, till ptyalism came on; and, if it was necessary to have the mouth sooner affected, a drachm of mercurial ointment was rubbed in on the affected side every night. No opium was then thought of; but the hypothetical prejudice against that valuable article is now, I believe, pretty well worn off; and I know, from pretty ample experience, that in conjunction with antimonial powder, it forms a most admirable auxiliary to the mercury; not only soothing many uneasy sensations of the patient, but determining to the surface, and promoting a diaphoresis, which is of infinite service in this, as in most other diseases.

In all *urgent* cases, I seldom gave less than twenty-four grains of calomel in the twenty-four hours; and generally in the following manner:—

℞. Submur. Hydrarg. gr. vj.
Pulv. Antimon. gr. iij.
Opii, gr. ss.
M. ft. bolus—sextâ quâque horâ sumendus.

During the exhibition of these medicines, an occasional dose of castor oil, or other laxative, with emollient injections, contributed to mitigate the griping and tenesmus; while blisters and leeches often relieved the local pain of the side. But these were only secondary considerations; and the grand object was to get the mouth affected, when the flux and other symptoms were sure to give way.

The secretion of healthy bile—the flow of saliva from the mouth—and a gentle and uniform perspiration on the skin, were synchronous effects of

the medicine, and certain indications of the approaching cure. But it was necessary to keep up these by smaller doses of the medicines alluded to, not only till every symptom of the disease had vanished, but till the clear countenance, keen appetite, and regularity of bowels had returned, and health and *strength* were completely restored.

Indeed, a degree of obesity generally succeeds the administration of the medicine, and the cure of the disease; nor need we wonder at this, when we consider the previously deranged state of the digestive organs, to which a renewed energy is now communicated.

But, in effecting these salutary objects, I have sometimes been obliged to push the mercurial treatment in a much bolder manner than above described. I have myself taken calomel in twenty-grain doses, three times a day, without experiencing the slightest inconvenience from the quantity; nay, I often found large doses sit easier on the stomach, and occasion less irritation in the bowels than small ones. At this time, too, I was using every exertion, by inunction, to forward the ptyalism; yet it was several days before I could produce any effect of this kind. These doses may astonish those who do not know the difficulty of affecting the mouth with mercury in a hot climate, when the liver is verging to suppuration. The idea of their purging and griping at these times is truly chimerical. Indeed, I never saw any of those terrible cases of hypercatharsis which people so much talk of, except where cold was applied, and perspiration checked, during salivation, when certainly, as may naturally be supposed, a severe bowel complaint is the consequence.* But in that dangerous state of the liver which I have mentioned, when a few hours, perhaps, must determine whether healthy secretion or destructive suppuration is to result, a tardy, irresolute practice is pregnant with mischief. Unfortunately, at this critical period, such is the torpor throughout the lacteal and lymphatic vessels of the abdomen, that the largest doses internally, and the most assiduous inunctions externally, will sometimes fail in introducing a sufficient quantity of mercury to saturate the system. In the mild climate of Prince of Wales's Island, where the temperature of the air might be supposed to favour absorption, I have had a couple of Malays daily employed, for hours at a time, in unsuccessful frictions, the lymphatic vessels refusing to take up the ointment in any considerable quantity. At the commencement of this disease, and of dysentery, I have often been able to form a tolerably accurate prognosis of the difficulty that would be experienced in raising ptyalism, by observing the aptitude of the absorbents on the surface, while a drachm or two of mercurial ointment were rubbed in on the thigh or arm, under my own inspection. This hint may be worth attending to.

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* "Granis viginti perfrequenter usus sum, duis autem, quotidiano adhibitis aliquid incomodi, aut periculi, tali ab exhibitione pervenire nunquam observavi."—*Thesis on Hepatitis, by* T. B. Wilson, M.D. Surgeon, R.N. 1817.

Here the tepid bath, by determining to the surface, will sometimes so far restore the balance of excitability and circulation as to promote the absorption of the mercury, both from the external and internal surfaces of the body. But great care is to be taken to avoid a subsequent chill, and a consequent recoil of the circulation, which will be sure to aggravate all the symptoms instead of relieving them.—The nitro-muriatic acid is also to be used in these cases. The absorption of mercury into the system is also accelerated by causing the patient to swallow a considerable quantity of warm diluting drink, as thin water-gruel, every night at bed-time.

It might be expected that I should here point out the predisposing and exciting causes of hepatitis; but these have been, in a great measure, anticipated by the preceding remarks. I observed, that the application of cold to the body, during, and subsequent to, perspiration, was by far the most frequent manner in which the disease was contracted; but the European, and the casual visitor, may well wonder how cold can be often applied on the burning coast of Coromandel, where the temperature is high and steady by day—where the nights are, for months together, hot—and seldom raw or damp, as at Bombay or Bengal. A nearer inspection dispels the difficulty, and shews us that nothing is more common than such an occurrence. The European soldier, or sailor, exhausted by exercise in the heat of the day, and by profuse perspiration, strips himself the moment his duty is over, and throws himself down opposite a window or port, to inhale the refreshing sea-breeze; his shirt, in all probability, dripping with sweat. The effect of this present gratification is well exemplified every day before his eyes, by the officers of his ship or regiment, who, when *Abdars* and saltpetre are not at hand, refrigerate their wine or water, by suspending the bottles in wetted cloths (generally worsted or woollen) and exposed to a current of air, when the evaporation, in a few minutes, renders the contained fluid quite cold.

It requires more philosophy or self-command than generally falls to the lot of the aforesaid classes, to resist the grateful refreshment which this dangerous indulgence affords. The dreadful sensations arising from heat and thirst imperiously demand fresh air and cold drink, which few have stoicism enough to forego, even where the bad consequences are previously known. I shall have occasion, hereafter, to relate some fatal instances of this kind, which happened under my own eye. The night, which Nature designed as one of the grand restoratives of our energy, is the time when many imprudent exposures, of the species described, are made among sailors and soldiers; particularly the former, on account of the close and sultry apartments in which they sleep, whereby they are forced to make frequent nocturnal visits to the open air, while they are streaming with perspiration.

It is asserted by almost all writers on tropical climates, that atmospherical vicissitudes are comparatively trifling in those regions, and that the thermometrical range is seldom of greater extent than from five to ten degrees daily, and fifteen or sixteen degrees annually. "In countries between the tropics," says Dr. Moseley, "the heat is nearly uniform, and seldom has been known to vary through the *year*, on any given spot, either by *day or night*, 16 degrees."—p. 2. This is not correct: the thermometer, at Bombay and Calcutta, in the month of January, is frequently as low as 55° in the night: and in the month of April up to 90°, or even higher, in the day; making an annual vicissitude of thirty-five degrees. And, notwithstanding Dr. Moseley's assertion to the contrary, a transition of eighty degrees, *in one day*, has been witnessed between the tropics. Sir James Macgrigor, in his Report to the Medical Board at Bombay, for the month of November, 1800, observes, that "the mercury had an extraordinary wide range, from 68°—50° to 130° in the open air."—*Edin. Med. and Surg. Journ. July*, 1805, *p.* 271. And he shortly afterwards adds—"More cases of *hepatitis* appeared than in either of the two former months."—*ib.* But even on the Coromandel coast, the *actual* vicissitude to which the human frame is often exposed, far exceeds what is generally believed. Let a thermometer be suspended in the open air at Madras, and it will point for many hours in the day to 120° or 130°, but in the night it will fall to 80° or 82°. Here, then, is the range of 40 or 50 degrees in the day, to which hundreds of European soldiers and sailors are unequivocally exposed; for, let it be remembered, that they are kept neither in glass cases nor the cuddies of Indiamen, though the above consideration ought to intercede powerfully in their behalf, and induce their officers never to subject them to such dangerous vicissitudes in a climate of that kind, unless from inevitable necessity.

But this subject will meet with a very full consideration in the prophylactic part of this Essay, where I hope to offer some important remarks on certain means of preserving health in hot climates, connected with the above topic, which have hitherto been passed over unnoticed or misunderstood by medical authors.

I need hardly remark, that intemperance in spirituous liquors strongly predisposes to and excites hepatitis. But it is not generally known, or suspected, that the depressing passions, particularly grief, have the same effect. I have seen many instances, however, where no doubt could be entertained on the subject. I shall only relate one. In the month of December, 1803, while H. M. S. Centurion was lying at anchor in Mocha Roads, two men, when in the act of loading a gun, had their arms blown away, and were otherwise dreadfully shattered, by the gun going off, in consequence of the neglect of a boatswain's mate, who was captain of the gun. One of the men died, and the circumstance produced such a degree of

remorse and grief in the mind of the careless boatswain's mate, that he was instantly seized with hepatitis [though in the prime of life and health], and in a few days followed his unfortunate shipmate to the grave!——The close sympathy which subsists between the *brain and liver* is well known, and strongly illustrated in hot countries, where the latter organ (like the lungs in Europe), being predisposed to disease from the general effects of climate, suffers readily and obviously, in consequence of the sympathy in question.

CHRONIC DERANGEMENTS OF THE LIVER.

I shall now make a few observations on those chronic derangements of the liver and its functions, which, in hot climates, succeed violent or repeated attacks, such as I have already described. These derangements, however, (especially of function,) are but too often the consequence of long residence between the tropics, independent of any serious or acute inflammation in this organ. Where induration, enlargement, or any particular structural alteration has taken place, the external accompaniments are evident to the most superficial glance.

Sallow countenance—emaciation—irregular bowels—high-coloured urine—scalding in its discharge—low spirits—often a chronic flux, with pain, fulness, or hardness in the region of the liver—evening fever—dry cough, and swellings of the ancles, are the prominent features of this deplorable malady. A degree of induration and enlargement continued nearly three months after a severe attack of hepatitis which I experienced in my own person; and a distressing bowel complaint succeeded, and harassed me for more than a year.

A return to Europe brought me no relief; on the contrary, by getting cold in my feet, while sitting in a dissecting room in London, a few weeks after my arrival, a violent hepatitis was induced, accompanied by the usual dysenteric symptoms. The flux that preceded, for so many months, this last relapse, may serve as a specimen of those connected with chronic hepatic obstruction.

Once, perhaps, in the twenty-four hours, generally in the morning, there would be an ill-conditioned fæcal evacuation, accompanied with mucus, slime, and apparently vitiated bile. After this, I would have two, three, and sometimes four hours' respite. An uneasy sensation would then arise in my bowels, with rumbling and flatulence, which would proceed along the whole track of the intestines, when I was forced suddenly to stool, nothing, however, coming away but some slimy mucus, streaked occasionally with blood, or greenish, bilious sordes. This discharge was always attended with more or less griping, straining, and some slight degree of tenesmus; after which another interval of ease, two or three hours in duration, would take place, and then the same

symptoms as before described, continuing, with great punctuality, for weeks and months together. During this period, my appetite was tolerably good, but my spirits exceedingly irregular—generally depressed. The least excess in eating or drinking—the exposure to night air—or the slightest application of cold to my feet, aggravated my complaint. The cheering prospect of returning to my native home, and the hopes that climate alone would effect a cure, together with the want of accommodation for undergoing a course of medicine on a voyage, where I was only a passenger, induced me, most unwisely, to delay the only effectual means of curbing the disease; till a nearly fatal relapse forced me to have recourse to that medicine which more than once before preserved my life. The flux, which all this time was symptomatic of liver obstruction and irregular secretion, was completely removed with the original cause.

Two circumstances appear to me almost always attendant on these chronic diseases of the liver—diminished secretion of bile and low spirits. The former we may account for in two ways; either as resulting from that atony which takes place in an organ that has been long stimulated into inordinate, or at least irregular action, by hot climates, &c. or from structural derangement, generally induration, which but too often accompanies the preceding state. It is likewise certain, that the bile is vitiated in quality, as well as deficient in quantity. And the numerous complaints which we hear from people, with evidently torpid livers, of *excessive secretion*, which they conclude must be the case from the nausea, vomiting of green bile, sick headaches, yellowness of the eyes, gripes, &c. with which they are occasionally harassed, arise from irregular, but, on the whole, diminished and disordered biliary secretion.

I do not think the ingenious Dr. Watt has been very happy in his pathological elucidation of bilious diseases.—"The liver," says he, "receiving its stimulus from venous blood, has more to do than in health; hence the origin of bilious complaints, which, with low spirits, and prostration of strength, generally mark the first stage of disease."—p. 207. The liver may have *more to do* in bilious diseases than in health; but I am well convinced *it does less*. The torpor in that organ keeps a general plethora, throughout the abdominal system of black blood; consequently, when it happens to be occasionally excited into unusual action, a greater flow of vitiated biliary secretion ensues, from this very cause; when, unless proper means are employed, the viscus falls back again into its previous state of inactivity. This view of the subject elucidates the effects of venesection, purgatives, and all the best remedial processes.

The torpid state of the bowels, dependent on that of the liver, admits of morbid bilious accumulations (after those periods of excitement) which lurk about the duodenum, or regurgitate into the stomach, by inverted peristaltic motion, producing all the phenomena alluded to. But, in a

great proportion of patients, the torpidity of the alimentary canal is seldom roused by the acrimony of the bile; costiveness and low spirits going hand in hand, with the most obstinate uniformity.

The increase and amelioration of the biliary secretion, then, must always be kept in view, when treating this chronic, obstructed, or torpid state of the liver.

The connexion which I have traced between the biliary and perspiratory processes, will elucidate the operation of those means of relief which experience has determined; it will also suggest the use of some others. Among the remedies for this complaint, mercury, given in small doses, and slowly, so as to keep up a brassy taste in the mouth for some time, holds a distinguished rank; as it effectually promotes the secretion of bile, and excites the extreme vessels on the surface.

To increase the latter effect, however, it has been found useful to combine with it a small proportion of opium and antimonial powder, both to guard the bowels from irritation, and determine to the skin. It is quite evident, and ought ever to be kept in mind, that no *violent means* should ever be used in stimulating an organ to action, whose torpor or derangement has proceeded from this very stimulation. The state of the liver here may be compared to that of the stomach in a worn-out drunkard. It requires stimulants; but they must be nicely managed, else they will be productive of mischief instead of utility.

The next most salutary remedial process, is to keep up a regular peristaltic motion in the bowels, and excite the mouths of the excretory ducts of the liver, which will tend to eliminate the viscid and depraved secretions from that organ itself. I have found no medicine better adapted to this purpose than the following:

℞. Ex. Colocynth. Comp. ʒiss.
Subm. Hydrarg. gr. xv.
Antim. Tartarisat. gr. iij.
Ol. Carui, gtt. viij.
M. Fiant pilulæ No. xxx.

Vel.

℞. Ex. Aloes spicat. scrupulum.
Pulv. Antimonialis, gr. x.
Pil. Hydrargyri, ℈j.
Ol. Carui, gtt. vj.
M. Fiant pilulæ No. xv.

One or two of these pills, taken occasionally at bed-time, will move the bowels gently next morning; carry off diseased, and promote healthy secretions of bile; and will be found to obviate, in a wonderful manner, that mental despondency, and long train of nervous symptoms, so constantly attendant on this complaint.

Our attention is next to be directed to the cuticular discharge. This

is never to be forced by heating or stimulating, but an insensible halitus promoted, by the most gentle means. Moderate exercise, particularly gestation, as determining to the surface without fatigue, is highly useful. A sea voyage, combining these advantages with a more equable temperature, and keeping up a slight nausea, as it were, by which the cutaneo-hepatic secretions are increased, will be found beneficial where it can be commanded. The swing, an easy, and perhaps no bad substitute for gestation, or a sea voyage, I found very useful in my own case. I was led to try it for amusement only, and to dispel the ennui of protracted convalescence. It certainly has considerable effect on the skin—powerfully determines to the surface—and relieves those internal congestions so connected with, and dependent on, torpor or obstruction in the liver. The assiduous and daily application of the flesh-brush over the hypochondriac region will be found to excite the healthy action of the biliary organ in no mean degree. Blisters, or the more permanent drain of a seton in the side, where there is much local uneasiness, will likewise be had recourse to with advantage.

Flannels are essentially necessary, more particularly in the variable climate of this country, with the minutest attention to the warmth and dryness of the feet, especially where the bowels are tender. In torpid livers, where costiveness is a common symptom, flannels, by increasing the cuticular discharge, appear at first to constipate. But here, as in the costiveness arising from a sea voyage, no ill effects whatever are induced; on the contrary, the digestion improves, evidently from the biliary secretion being augmented in both cases.

On the other hand, where hepatic obstructions exist, with determination to the bowels, keeping them in an irritable state, as in my own case, the utility of flannels becomes both real and apparent.

In addition to the general use of flannel, the local application of a bandage of the same round the waist, in imitation of the Indian *cummerband*, is, in these cases, peculiarly advantageous. The native soldiery in India often contract bowel complaints from incautiously throwing off the *cummerband*, when heated on a march. I could state numerous instances, where the worst consequences resulted from negligence in this respect.

The tepid bath, using the utmost caution in avoiding a subsequent chill, will evidently be serviceable, on the same principle; as well as the warm mineral waters taken internally, as recommended by Dr. Saunders. The Carlsbad, Kissengen, or Marienbad waters are very beneficial in chronic obstructions of the liver. The artificial waters at Brighton are no bad substitutes for the original springs. The night air and late hours are to be most religiously avoided; and a rigid temperance, amounting to abstinence, enjoined. In short, he who labours under obstructed liver, and hopes to protract his existence with any kind of comfort to himself, must abandon what are called the "pleasures of the table;" but which are, in reality, the bane of human health. Quantity is doubtless of more conse-

quence than quality; yet raw vegetables and pastry, from their increasing acidity and rancidity in the stomach, are very generally detrimental. Tender animal food, in small quantities, with well-baked bread, or ship-biscuit, form, perhaps, the most easily digested aliment in such cases. In India, and, I believe, in Europe, rice and curry will be found a salutary dish. The stimulus of the spice is very different from that of spirits or wine; and the rice is, without exception, the most unirritating, nutritious, and easily digested vegetable, which the bountiful bosom of the earth produces.

With respect to drink, although I certainly would recommend to my patient the laconic Greek prescription in the pump-room at Bath; yet I fear that most of those returning from the East and West Indies, afflicted with hepatic complaints, while they readily allow that "water is best"—nevertheless unanimously agree, that wine is most palatable. If the latter cannot be dispensed with, the acid and astringent kinds, at least, are to be rejected. Malt liquor, with the exception of Hodgson's or Bass's pale ale, will seldom agree, and spirits ought to be restricted as much as possible. A dilute mixture of brandy and water has an indescribably soothing effect on the stomach and bowels, in these cases, and agrees best.

All the preceding remarks presuppose that a change of climate has been effected;—for such is the state of the biliary organ, after repeated attacks of hepatitis, or a long residence between the tropics, that the most active of the above-mentioned remedial means will give but temporary relief, while the original cause continues to be applied. And yet the removal from a tropical to an European climate requires caution. Nature abhors extremes and sudden vicissitudes. It certainly is dangerous to return to this country in Winter, as I myself experienced. I landed in January, and, before the end of February, I had a complete relapse of hepatitis, and its accompaniment, flux.

The Malayan peninsula, from its being a narrow slip of land, washed on both sides, and nearly encompassed by the ocean—constantly covered with verdure, and open to the sea-breezes, is blessed with a milder and cooler air than any continental part of India between the tropics and bordering on the coast.

Columbo, in the Island of Ceylon, has also some local advantages, that render it extremely salubrious to Europeans, and consequently a convenient and easy retreat from the opposite burning coast. The Himmalaya and Neilgherries are the grand sanitaria.

The Cape of Good Hope, however well adapted to the refreshment of a crew, after a long voyage, by its abundant supplies of animal and vegetable food, is by no means calculated, in regard to climate, for the recovery of hepatic or dysenteric individuals returning from the East. The daily atmospherical vicissitudes, at this celebrated promontory, are very great indeed [25 or 30 degrees], and consequently injurious where the bowels

are at all affected. I shall only mention one instance corroborative of this assertion.

His Majesty's ship Albion, on her late return from India, having touched at the Cape, sent a number of her people to the hospital, afflicted with chronic bowel and liver complaints. By the time of her departure for England, however, several of these had died, and all the others returned in a worse state than when they went on shore. This fact is worth attending to; and deserves to be kept in mind by the valetudinarian.

The climate of St. Helena, approximates more to that of Europe than the climate of any other intertropical situation. A rock, only twenty-seven miles in circumference, surrounded by an immense equatorial ocean, above the level of which it projects 3000 feet; whose summit is covered with perpetual verdure, and cooled by perennial breezes, must enjoy a serenity of air, and evenness of temperature, far beyond any part, either of the Indies or Europe. The medium height of the thermometer is 64°, and the atmospherical vicissitudes by no means great or sudden. At Plantation-House, the mercury does not rise higher than 72° in Summer, nor fall lower than 55° in Winter. A temporary stay in the sheltered parts of this island would probably be attended with a salutary seasoning, preparatory to exposing the debilitated frame to the rude inclemencies and transitions of northern regions. The scenery, too, of the *interior*, is as beautifully romantic, as that of the *exterior* is stupendously dreary and barren. The society, however, is confined, and forms a striking contrast with the social ease and unbounded hospitality of the East. But, alas! it is a melancholy truth, that in the complaint I have been describing, a surprising mental despondency, or propensity to brood over misfortunes, pursues us through every climate!—

Scandit æratas vitiosa naves
Cura!—Quid terras alio calentes
Sole mutamus?—*Atrabiliosus*
Se raro fugit!*

XIX. Sympathetic Connexion between the Mental and Hepatic Functions.

The manner in which this mental depression becomes connected with derangement in the hepatic function is a subject of curious enquiry. It is not a little singular, that two of the most important organs in the human body—the lungs and the liver, when in a disordered state, should exhibit a

* In later years, and during Napoleon's exile in this Island, dysentery prevailed, to a considerable extent, at St. Helena.—The climate is often foggy.

striking contrast in their effects on the mind. Thus, even in the last stage of phthisis—" Hope springs eternal in the *hectic* breast;" and the final catastrophe stands a long time revealed to every eye but that of the patient.

In hepatic diseases, on the other hand, like Shakspeare's cowards, we " die many times before our death." It is a curious fact, that syphilis, a disease which can only be cured by that medicine on which we place our principal dependence in hepatitis, is likewise attended with a similar despondency, but in a much less degree. There certainly is a greater connexion or reciprocal influence between the mental and hepatic functions than is generally known or suspected. Experience has shewn that both *excess* and *deficiency* in the biliary secretion affect the mental functions, though in a somewhat different manner. The former seems to exert its influence in two ways, viz. by its irritation in the primæ viæ, and by its absorption into the circulating system. That vitiated bile irritates the stomach and bowels is admitted by all; and that part of it is occasionally absorbed, or regurgitates into the circulation, is equally evident, from the appearance of the eyes and countenance. The mental effects, in both these cases, are characterized by irritability, and what is properly called a choleric disposition; often, however, accompanied by the deepest dejection of spirits, amounting almost to despair, where no other adequate cause exists.

On the other hand, the defective secretion of bile seems to operate on body and mind, in three ways, viz.—By the insipid quality of the bile—by its absorption—and, simply, by its paucity: the mental effects characterized, in such cases, by melancholy or despondency. The insipidity of the bile in those diseases where the secretion is lessened, as in hypochondriasis, chlorosis, &c. has been noticed by Dr. Saunders and others. The consequence of this will be a torpor throughout the system at large: hence costiveness, imperfect digestion, chylification, sanguification, &c. ensue, the influence of which on the mind is obvious.

The bile, however, is not always insipid in quality, where it is deficient in quantity. In those cases where it proceeds from structural alteration of the liver, or succeeds violent diseases of that organ, the bile is occasionally as vitiated and acrid, as where excessive secretion is going on. This takes place, especially when those causes are applied which formerly produced great excitement in the extreme vessels of the vena portæ; as high temperature—exercise in the sun—debauches—violent gusts of passion, &c.

In hot climates, indeed, I have thought that an inflammatory state of the liver was sometimes induced, or at least increased, by the acrimony of its own secretions. It has frequently been remarked by others, and felt by myself, that after brisk doses of calomel and cathartic extract, the bilious evacuations have produced a sensation, as if boiling lead were passing through the intestines. The freedom of spirits, or sensorial energy, that succeeds, can only be appreciated by those who have experienced such dis-

gorgements of vitiated bile! Every one has observed how diseased secretions, from the internal surface of the urethra, occasionally inflame and ulcerate the preputium and glans penis, if the greatest care be not taken to defend them by cleanliness: can we doubt that something of the same nature may take place in the intestines, and even in the ducts of the liver itself, where the biliary secretion is extremely depraved and acrimonious? The *remora* alone of viscid bile in the pori biliarii and excretory ducts of the liver, may often occasion such obstruction in its languid circulation as shall give rise to inflammatory congestion in the organ. As I have shewn, therefore, that with irregular and diminished secretion, there is always a degree of vitiation, absorption, and irritation, I beg leave to designate their united effect on body and mind, by the term "*Morbid biliary irritation or influence.*"

I conceive that this is quite equal to the task of originating those mental maladies which, in their turn, *re-act* on the liver, stomach, and intestines, disturbing their functions still farther, or increasing their torpor, as well as that of the whole system, by sympathy; producing, at length, the extensive catalogue of dyspeptic, hypochondriacal, and, perhaps, hysterical complaints!

Is it not this "non-secreted bile"* which gives that peculiar sallow complexion to Europeans long resident in hot climates, so distinguishable from a jaundiced suffusion of absorbed or regurgitated bile; and which is probably the first shade that Nature effects, in bending the colour to the climate? Europeans do not begin to assume this *sallow* tint, till the period of superabundant secretion is long past, and till atony and diminished action in the hepatic system have commenced. Indeed it is very possible, that what at first produced such commotion and inconvenience in the animal economy, would, in the course or a few generations, effect those corporeal changes in the exterior, which ultimately counteract in a considerable degree, the baleful influence of the climate itself. To be more explicit. The derangement in the hepatic functions, originating, indeed, through sympathy with the skin, affects, in its turn, the tincture of that skin, by means of absorbed and non-secreted bile; and these yellow and sallow tints, acted on by the rays of a tropical sun, gradually verge, in the course of generations, to a sable hue. This change of colour, and, in some degree, of texture also, (for the rete mucosum is *thicker* in Indians than in Europeans,) renders the exterior of man less sensible to atmospherical heat; in consequence of which, a more mild and uniform action in the perspiratory vessels succeeds, and, by sympathy, a correspondent equilibrium in the secreting vessels of the liver. Thus the skin, which was the first cause of disordered secretion

* By "non-secreted bile," I mean the elements from whence bile is formed.

in the liver, becomes ultimately the grand protection of that organ, and the derangement itself, in process of time, creates its own antidote. This is quite conformable to the known wisdom of Providence, and to the unceasing exertions of Nature, in remedying what she cannot entirely prevent.

This is a different doctrine from that of Dr. Smith: he attributes the black colour of Indians to the superabundant secretion of bile, and its suffusion on the surface; but that will not stand the test of examination. He does not take *diminished secretion*, or the elements of bile, into the account; nor does he trace any connexion between the hepatic and cutaneous functions. May not the disposition to ulcers in hot climates, and among drunken sailors in our own climate, be accounted for by this *cutaneo-hepatic sympathy?* In the first case, the *cutaneous* vessels are debilitated by the heat, and the *hepatic* by sympathy. In the second case, the vessels of the stomach and liver are debilitated by *drink*, and the *cutaneous* vessels by sympathy.

The effects of intemperance in spirituous liquors on the liver and its functions, are not only known to every tyro in the profession, but are proverbial in the mouths of drunkards themselves; little, therefore, need be said on this subject. But that the "depressing passions" should produce certain derangements in the hepatic functions, which, re-acting on the mind, give rise to, or aggravate the whole Proteian host of hypochondriacal, hysterical, and nervous disorders, is by no means generally admitted; though the doctrine will probably gain ground.

The first effect of these depressing passions in the female sex is felt in the organs concerned in digestion—atony in the stomach—torpor in the liver and intestines. The aliment passes into the duodenum imperfectly digested—it there meets a scanty supply of ill-conditioned or insipid bile, and pancreatic juice. Under these circumstances, the progress of the chyme through the convolutions of the intestines must be slow, and the chyle imperfectly eliminated. Fæcal accumulations take place; and probably the fermentative process goes on, for want of bile, with an extrication of air, which gives rise to distressing colic and borborygmi. To procure relief from these, the spirituous tincture and cordial have often been the harbingers of more dangerous indulgences, and increased the malady which they were intended to alleviate!

By a careful course of cathartics, the bowels are cleared of that load of fæcal and other matter, with which they were oppressed. Healthy bile is thus solicited into the intestines, instead of having its elements floating in the circulation.—This natural stimulus promotes chylification, which, strengthening the whole material fabric, communicates energy to the mind, till, at length, the bloom of health once more revisits the sallow cheek of despondency.

XX.—*Researches into the Causes, Nature, and Treatment of the most prevalent Diseases of India, and of Warm Climates generally. Illustrated with Cases, post-mortem Examinations, and numerous coloured Engravings of Morbid Structure.* By JAMES ANNESLEY, Esq. Imperial quarto, pp. 700, with plates, &c.*

THIS magnificent work will transmit Mr. Annesley's name to posterity, in conjunction with the medical history of our extensive empire in the East. We know not which to admire most—the indefatigable labour, and the unconquerable zeal of the author in the collection of his facts, or the beauty and fidelity of the plates, which portray the ravages of disease as it appears in the Torrid Zone, with the most scrupulous accuracy.† We hope and trust that the East India Company will do an act of justice in rewarding Mr. Annesley for the toil of mind and body which he must have undergone in the construction of this immense undertaking —leaving the tremendous expenses out of the question. If they can so cheerfully vote away their thousands in the annual pension of those who make war—they surely might well expend a few hundreds in the encouragement of those whose labours will mitigate the miseries of warfare and the deleterious influence of climate, long after their bones are mouldered into dust.

We do not deem it necessary now to apologise for dwelling on those diseases which scourge our countrymen beneath a foreign and burning sky. Some of the greatest improvements in medicine have resulted from researches made in hot climates—and there is not a single fact observed, or a single disease investigated on the banks of the Ganges or the Mississippi, that does not bring its quota of utility to the practice of medicine in our own country.

After stating the excellent means which he possessed, for a great many years, in India, of acquiring and registering the most authentic information, Mr. Annesley remarks as follows:—

"In India, the medical practitioner has every possible opportunity of

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* Since the fourth edition of this work was published, great accessions have been made to the knowledge of hepatic diseases and their treatment—especially by Mr. Annesley. I shall therefore proceed to avail myself of the labours of those who have succeeded me in the field of investigation, in order to enhance the utility of this volume, which must now be considered more in the light of a compilation than of an original work.

† It will doubtless be said that some of the plates are too highly coloured. This may be true—and it is an objection to most coloured plates. But it should be remembered, that diseases run a rapid course in high temperatures, and that dissections are necessarily made there, in a few hours after death.

investigating disease by *post-mortem* examinations, and of connecting the symptoms and treatment with those morbid changes which take place in its course. To this subject the Author has alway paid especial attention: but the great difficulty of describing morbid structures, and the impossibility of preserving the natural appearances in the way morbid preparations are usually made, led him to cause Drawings to be executed of the more interesting and remarkable changes produced upon the internal organs by the diseases he was called upon to treat. Circumstances placed in his power the means of accomplishing this object, and he fully availed himself of them. *Post-mortem* examinations necessarily take place in warm climates soon after death, and before the capillary circulation in the internal organs has undergone that change which is experienced after a few hours, or before the blood has returned from the minute arteries into the venous trunks. Thus, the warmth of the climate has indirectly enabled him, it may be presumed, to give a more correct delineation of the appearance of diseased structure than could otherwise have been obtained. The knowledge unfolded by this circumstance induced him to follow up the indications to which it pointed; and as an early examination of the subject of disease after death appeared necessary to accurate ideas as to the more minute changes and finer shades of disorder, impressed upon the different internal viscera during life, it was never neglected when it could be practised with propriety."

This is a very important consideration, and tends to enhance the value of the work under review. We must pass over the preliminary discourse of our author, in which he dwells, with allowable earnestness, on the advantages which a long residence in India has conferred on himself—and points out, in no very measured language, the sources of error which may have operated, where the residence has been short, the scene of observation limited, or the constitutions of the patients of a peculiar description. All these things we are ready to grant to our experienced author; but we would just hint, from some 30 years' close observation of men in all climates, that it it a comparatively rare occurrence to find any discovery or improvement in medicine result from *mere length of experience.* We refer Mr. A. to the history of our art generally—and to the medical history of tropical climates particularly, for the proofs of this position. Mr. A. regrets that few or none of the old and experienced practitioners of India have left us any records of their practice. If we look to the West, we shall see the same thing. Have any of the old residents of the Antilles left us any works to compare with those of Jackson and others, who were only a few years in that unhealthy climate? In short, unless observations are made in the vigour of life, by medical men in hot climates, they will never be made at all! After a certain number of years, in hot as well as in cold climates, the current of zeal, in the minds of medical practitioners, is too often dried up or frozen up—and it is replaced either by a sharp

look out for the "main chance"—or a settled resolution to take things easy—to enjoy the short span of existence with as little encumbrance as possible—and to leave to others the trouble of observing for themselves, as they themselves were obliged to do! Mr. Annesley, it is true, forms an exception to the general rule. He is a "rara avis in terris"—but he may take our word for it, his call on the old practitioners will meet with few responses. Let us, therefore, be thankful for the contributions of our younger brethren, both here and elsewhere—and let us be doubly thankful to such men as Mr. Annesley, who have devoted a long series of years to practical and pathological researches beneath the enervating influence of a vertical sun, and surrounded by so many temptations to indolence and luxury!

But, leaving these considerations on one side, we come to the work itself. We must pass over the whole of the first chapter of the work, occupying 45 folio pages, which treats of the physiology of digestion, and the functions of the liver, spleen, &c. Considering what a size and price Mr. Annesley's book necessarily amounted to, we cannot but think a chapter on the mere elementary matter of digestion, to be found in the school-books already in the possession of even pupils, was somewhat impolitic. We next come to the second chapter, exhibiting "a general view of the causes chiefly productive of diseases in warm climates, particularly in India."

MALARIA.

This subject has been treated in so masterly a manner by Dr. Macculloch, that little or nothing new or interesting can be expected from Mr. Annesley. The copious analysis which we have given of Dr. M.'s work will be a sufficient excuse for passing over the section in question from the pen of Mr. A. We shall notice one particular only. The writers on marsh miasmata have generally insisted, especially since Dr. Bancroft's Essay appeared, that animal matters have nothing to do with the poison of terrestrial exhalations. We have always been of a different opinion, and the following passage shews that we have Mr. Annesley on our side.

"A most important circumstance, which goes far to account for the much greater unhealthiness of moist and marshy situations in warm countries, is the quantity of animal matter, in a state of decomposition, which they present. The same circumstances which render vegetation quick and luxuriant, tend also to generate immense swarms of reptiles and insects; the exuviæ and dead bodies of which, mingling with vegetable matter in a state of decay, and combining with moisture, give rise to miasms of a much more noxious description than those resulting from vegetable decomposition and moisture alone. In the course of our experience in warm climates, we always have considered the number of insects and reptiles with which a

place abounds, as more indicative of its unhealthiness than any other circumstance; for in it there is a most powerful cause of disease in its worst forms superadded to those already in existence; and, as the one cause is extensive and powerful, so, generally, is the other. The great unhealthiness of low, moist, and marshy places in temperate climates, during warm seasons, particularly in the months of July, August, September, and October, is as much owing to the immense swarms of insects which then abound, and which die during these months. Italy furnishes numerous proofs of this; and every warm country in the globe will verify the axiom, that a place is unhealthy in proportion as it furnishes, with the various causes of disease depending upon locality and temperature, animal remains and animal substances in a state of decomposition, mingled with the products resulting from the decay of vegetable matter."

In a subsection, Mr. Annesley introduces some remarks on the nature, properties, and effects of miasmata—and on the manner in which they invade the system. In respect to the *first* point, it is hardly necessary to say that we know nothing. We are as ignorant of the nature or essence of malaria as we are of the inhabitants of the Georgium Sidus. Of the properties and laws of vegeto-animal effluvia, we have taken ample notice in our review of Dr. Macculloch's Essay—and Mr. A. appears to have drawn pretty freely on that and all preceding works on malaria. We shall proceed at once to "the effects of malaria on the human constitution." Intermittent and remittent fevers, of course, are the acknowledged products of the invisible poison—"even yellow fever, in its worst forms, seems to be the consequence of these causes operating in a state of greater activity or concentration upon highly disposed subjects." Mr. A. believes the plague of Egypt to be the product of malaria. Next in importance to fever, is dysentery, which, in its epidemic forms, Mr. A. ascribes (and probably with justice) to malaria. He does not deny, however, that sporadic cases of this disease are the products of vicissitudes of temperature, errors in diet, intoxication, and other causes. He thinks there can be no doubt that the scorbutic dysentery, so well described by the late Mr. Bampfield, is produced by terrestrial exhalations acting on constitutions badly nourished by improper food. He says the scorbutic dysentery which prevailed at Rangoon, and the endemic at the Milbank Penitentiary, are recent examples of this. Even hepatitis he is disposed to attribute to malaria conjoined with tropical heat. "There is seldom seen, within the tropics, a case of disease in which, upon dissection, the liver and spleen are both sound." In fevers from marsh effluvia, indeed, whether within or without the tropics, there seems to be a strong tendency to derangements of the liver and spleen. The exposure, therefore, to malaria, even when no fever or dysentery is produced, seems to affect the hepatic system, as we see in all marshy countries. The malaria of India has an infinitely greater effect on the European than on the native population. If the chil-

dren of Europeans are not sent home young, their constitutions are liable to be ruined, and the range of their existence abridged.

" In addition to the diseases we have enumerated as being produced among Europeans by malaria, and in addition to its blighting effects in warm climates upon a native white population, even when it fails of inducing active and specific disorder, we should particularize its influence in occasioning ulcers of the lower extremities, and foul sores, and even sphacelation and gangrene. Every military surgeon has numerous opportunities of observing, in the East, the relation which subsists between unwholesome situations and these disorders, both among Europeans and natives. Indeed, it seems to be a general and necessary effect of malaria to diminish the powers of life throughout the whole body ; and the phenomena accompanying and indicating this effect are various, according to numerous concurrent circumstances, to predisposing causes, and to concomitant influences. Of these we shall have occasion to speak when the diseases proceeding chiefly from this grand agent come specifically before us."

In respect to the modus operandi of malaria, or even the channel through which the poison is conveyed, Mr. A. is unable to furnish us with any positive information.

" But observation has supplied data, which, when calmly considered, seem to shew that terrestrial emanations, and all those causes of disease which float in the atmosphere, make an impression on those surfaces with which the air comes in contact : and this impression, when sufficiently strong, or frequently made, is productive of disease, either of the system generally, as in fever, or of some important viscus, as the liver or spleen. It is, therefore, chiefly to the internal surfaces of the lungs and air-passages that we are to look as the channels through which malaria makes its hurtful impression upon the animal frame. But whether it acts by deranging the healthy condition of the nervous system of the organ, which derangement produces farther disorder until specific disease is fully formed ; or whether the exhalations floating in the air are actually absorbed from the surfaces of the air-passages and cells into the blood, vitiating this fluid, and, by its presence there, deranging the whole system, or some important viscus, it is impossible to decide. Both sides of the question have found supporters who have adduced arguments in behalf of their opinion, in the absence of positive proofs."

Mr. Annesley seems to conclude that both may be combined. The miasm may offend the nervous system, and, entering the circulation, may vitiate the fluids at the same time.

After taking a survey of those circumstances which favour the operation of malaria, as irregularities of all kind—and more especially the depressing passions, indolence, &c. our author devotes a subsection to the consideration of the means of preventing malaria, and counteracting its effects on the human body. These subjects have been amply discussed in our re-

views of Dr. Macculloch's volumes. We must pass over another great portion of the work before us, consisting of medical topography—embracing both hemispheres, as well as the Mediterranean. From a section on the diet of Europeans in India, we shall select the following passage, exhibiting the "diary of a day," if we can use such an expression. It is a matter of curiosity, in more than one respect.

"The military officer goes to parade at six o'clock A.M., and breakfasts between eight and nine upon tea, coffee, or cocoa, with fish, meat, eggs, rice, and whatever may be most agreeable to him. From breakfast till one o'clock he generally applies to study or amusement, or to paying visits. The heat of the weather, and perhaps a hearty breakfast, and the nature of the articles taken at it, produce thirst, which renders the necessity of gratifying it urgent, and occasional draughts of wine and water, beer and water, or brandy and water, are therefore necessarily taken; and although this is by no means a habit, nor is indulged in beyond what seems a matter of necessity, yet it must, in a certain degree, be injurious. At one o'clock he eats a hearty tiffen, consisting of roast and boiled meat, fish, mullagatawny or other soups, various wines, bottled beer, &c. He afterwards occasionally rides out in the sun, and either lounges on a sofa, or amuses himself with cricket or fives till evening parade. Dinner is next disposed of, at seven o'clock, or half-past seven, or eight. This meal is, properly speaking, the supper, that which is taken at one o'clock being the dinner. The seven o'clock meal is generally profuse, consisting of soups, fish, rich and hot curries, roast and boiled meats, and other richly made dishes, with various wines, and bottled beer. To all this succeeds coffee or tea; and upon the repleted stomach and excited system he retires to bed at eleven or twelve, when the feverish collapse induces the sound sleep indicating plethora, or the restless slumbers attendant upon prolonged excitement."

The above is a faithful diary of a tropical sojourner in the military service, and we have reason to believe that it equally applies to the civil servant of the Company. This being the case, we cannot wonder that our countrymen return from the East more frequently with enlarged livers than lacks of rupees. It is seen that animal food is partaken of largely, at least twice, but generally thrice in the day, together with an abundant supply of various other stimuli and provocatives—all this, too, in a climate where adequate corporeal exercise cannot be taken, without immediate risk of life. That such a system of repletion must keep up a constant over-excitement in the digestive organs, including the liver and spleen, cannot be doubted. It would do so beneath the gloomy skies of England, with all the exercises of the field, and the bracing air of a British Winter! Mr. Annesley protests against this system of full living, and eloquently supports the arguments of those who have gone before him in this line of investigation. We cannot so fully concur with our talented and experienced author in his ideas respecting exercise in tropical climates. Mr. A. strenuously

recommends corporeal exercise "so as to promote a full and copious perspiration and regular circulation in the cutaneous surface." We are advocates for exercise, in all proper times and places; but we have been led, from personal feeling as well as observation, to regard corporeal exertion as much less adapted to tropical than hyperborean regions. The vessels of the surface are too much excited by the heat of an Indian atmosphere, even when a person is at rest, and therefore, we believe that quietude in the middle of the day is best, while we recommend exercise before sunrise and in the evenings, in moderation. This, indeed, after all, is the rule to which Mr. A. comes in the sequel.

In a chapter on the premonitory symptoms of diseases, we find many judicious observations. Every one knows that there is an interval between the application of a morbid cause—say the cause of fever, and the development of its effects. This may be termed the period of incubation. The phenomena which take place in this interval generally pass unnoticed, or unattended to by the patient; but a careful observer will see that the seeds of disease are sown, and that a storm is impending.

"In fuller illustration of this subject, we shall instance a very frequent case, and one that will be recognised, not only by those in India, but by those who have ever been there;—we allude to snipe shooting and hunting parties. These are generally arranged late in the evening, after dinner, and are entered upon early in the morning. It is impossible, therefore, that the individuals engaged in them can have the repose necessary to recruit the system from the exertions of the preceding day. After riding eight or ten miles, they commence snipe shooting in the marshes and rice-fields, where they are up to their knees in water; and thus, in a state of fatigue, they are at once brought within the influence of those marshy exhalations which are the most frequent exciting cause of fever in warm climates. The exposure to this cause taking place during a period of predisposition to its invasion, and at a time of the day when the cause itself is in considerable concentration, that impression is made upon the system which is productive of fever, and its future subject returns from his excursion with the seeds of it sown in his frame. For a day or two he complains of little or nothing excepting a weight in his back, loins, and limbs, some loss of appetite, and a disinclination to exercise, or employment of any kind. To these he attaches no importance, imputes them to fatigue from his excursion, and he does not resort to any means for removing them. They, however, continue, and even increase; and in a short time a slight headach, with confusion of ideas, comes on, especially towards evening, and is attended with disturbed repose and unpleasant dreams. His appetite now becomes further diminished, his countenance is pale, sallow, and a somewhat darker tinge is remarked beneath his eyes, which are at the same time muddy, and deficient of their usual expression and liveliness. These symptoms continue for several days: they are insufficient to confine him, or even to

excite ideas of his being actually ill; but he feels out of health, and every kind of occupation is a burden to him. At last, after a period widely varying in its duration, generally enduring from two or three days to a fortnight,—during which time these symptoms continue gradually to increase,—nausea often supervenes, the bowels become irregular, the tongue white and loaded, the countenance sunk and muddy, the surface cold, dry, and harsh; and, at last, irregular chills, formication, and even complete rigors, supervene, with sinking and a sense of anxiety at the pit of the stomach and præcordia, and increase of the pain in the head, loins, and limbs. This is that precise stage of the disease at which the patient generally becomes alarmed, and when he is first unable to keep about."

When we carefully consider the foregoing phenomena, which are correctly recorded, we will be constrained to admit, that they afford full as much support to the humoral, as to the nervous pathology of diseases. The sallow countenance, the dark tinge round the eyes, the white and loaded tongue, together with the deranged state of the secretions and excretions, which the author has not sufficiently noticed—all these are as indicative of vitiated fluids, as of disordered nerves in the body. Mr. A. goes on to state some causes of disease in warm climates, which are of considerable importance. The mode of living before-described, combined with want of exercise, tends to plethora, and this is aggravated by a constipated state of the bowels, and a vitiated condition of the secretions. These circumstances, our author observes, " tend very rapidly to vitiate the constitution of the blood itself." After making many judicious observations on the state of various functions, as indicative of incipient disease, Mr. A. comes to the second book of his work, in which he takes up the subject of disorders of the stomach, as they appear in tropical climates.

STOMACH DISORDERS.

Our author remarks that this class of complaints is comparatively rare in hot climates, at least in " a pure and uncomplicated form." They are seldom much noticed, till they become connected with, or give rise to, more serious disease, as of the liver or intestines. Mr. Annesley does not profess to go very deeply into the investigation of stomach disorders, and we are forced to confess, that the short dissertation contained in the work evinces neither novelty nor originality. Our author is disinclined to view, as some have done, the stomach affection as the *cause* of the biliary derangement. The causes of both these complaints, he properly observes, are simultaneously acting on the two organs, and, although the first symptoms are generally noticed in the process of digestion, yet it does not follow that disordered biliary secretion is behind hand in its part of the morbid process that is going forward. We are unable to glean any

thing from this chapter, and shall, therefore, pass on to that "on inflammation and organic lesion of the stomach." Mr. A. remarks, that simple and uncomplicated inflammation of this organ is an extremely rare disease in tropical and in cold climates. But the mucous coat is very frequently inflamed secondarily, between the tropics, in consequence of the extension of disease from the liver or other contiguous viscera. Mr. Annesley appears to place faith in the doctrine of Dr. Philip, that the advanced stage of indigestion is that of inflammation. The mode in which he conveys his belief is rather equivocal. "It (inflammation) *supervenes,* we are most thoroughly convinced, to a greater or less extent, in the advanced stages of dyspepsia." This may be the case, but this does not prove that inflammation is the *cause* of the disease. The following short case, which we shall extract verbatim from page 253 of the work before us, will shew how far the treatment of stomach affections needs reformation in some quarters.

"Case.—*Inflammation of the Mucous Coat of the Stomach supervening to Dyspepsia, and terminating in Ulceration.—Dissection.*

William Sparks, admitted 19th of June, 1815.—Returned from field service much emaciated, and extremely languid. Has been complaining for some time of dyspeptic symptoms, with occasional attacks of fever. Countenance sallow; tongue foul; some purging, without pain; no fulness in the hypochondria; pulse 78; skin warm and moist. Has used wine with tonics.—℞. Mist. amaræ (infusi gentian. comp.), ℥j.; tinct. cinchonæ, ℥ij.

22d.—Bad taste of the mouth, with nausea and general sickness; no desire for food; bowels ráther open.—Capiat Pulv. ipecacuan. ℈j. pro emetico. Take at 11 o'clock, A.M. Mist. amaræ, ℥jss.; tinct. ferri mur. ♏xij.

Evening.—Threw up some dark, grumous fluid after the emetic; several stools.—℞. Aq. menth. pip. ℥jss.; tinct. columbæ, ℥jss.

23d.—Feels pretty easy this morning; pulse is slow and languid.—℞. Infus. gentianæ comp. ℥jss.; tinct. ferri, ♏x. twice a-day. Continue the wine.

24th.—Repeat the draughts twice a-day, and wine.

26th.—Takes his draughts and wine; appears to be declining; debility increases; bowels loose. Continue draughts and wine.

Evening.—Seems much worse; some hiccup, and the pulse at the wrist nearly gone; debility extreme. Continue the wine.—℞. Mist. camphorat. ℥jss.; spirit. æther. nitros. ℥ij.; aquæ, ℥vj. M. statim. Blisters to the insides of the legs.

27th.—Died this morning.

Dissection.—The coats of the stomach were much thinner than natural;

the villous coat was found covered with small and numerous superficial ulcerations, which were still more numerous near the cardiac orifice; they discharged a thin brownish fluid, which was very fetid; the liver and spleen were sound. The small and large intestines appeared healthy."

Mr. Annesley condemns the practice in this case—and we have no hesitation in affirming, that "the inflammation supervening to dyspepsia," in this case, was induced by the treatment, and had no necessary dependence on the natural progress of the disease itself. But we cannot dwell on the stomach any longer, leaving the disorders of this organ to Abernethy and his followers, while the pathology will be best studied among Continental writers, who pay more attention to dissection than those of our own country.

DISEASES OF THE LIVER AND BILIARY APPARATUS.

It has often been remarked, that hepatitis is much more frequent in the Eastern than in the Western Tropics. The returns of regimental sick shew that it is at least treble in the former to what it is in the latter. In India, the average annual per-centage of liver-complaints, in the different divisions of the army, was estimated at 13 per cent. in the effective strength!

The increased secretion of bile observable in Europeans on their removal to a tropical climate, has been ascribed, by Dr. Johnson, to a sympathy between the skin and the internal organs. The sympathy is admitted by Mr. Annesley, but the doctrine is superseded by one first discovered by Crawford, Lavoisier, &c. and confirmed (as is said) by Dr. Copland, on the coast of Africa—namely, "that the quantity of carbonic acid gas, formed by respiration in a given time, is much diminished in high temperature, and under circumstances which lower the powers of life." This being established, they say, (for it is presumable that Dr. Copland speaks, together with the author) "it becomes a basis on which much *important speculation* respecting the origin of several intertropical diseases may be founded." Thus the diminished formation of carbonic acid gas in the lungs during a high temperature, must increase the secretion of bile, and so on. We do not deem it necessary to discuss this chemical physiology. There is one little fact passed over by the ingenious authors, which, in our humble opinion, proves fatal to the gaseous hypothesis. It is this. After a certain residence in hot climates, the torpid state of the liver is just as evident as the increased function of that organ was in the early residence. Yet the temperature of the tropics does not, we believe, alter, so as to accommodate the theory of one or other party. This fact does not militate against, but rather supports, the doctrine of sympathy between the skin and liver. In the long residenters, when the biliary organ falls below par in function, the skin is in an analogous state—dry and constricted. Our

authors have wasted a great many royal quarto pages in the pursuit of these theoretical phantoms, instead of filling them with practical facts, that might turn to better use.

" During our practice in India, we have had numerous opportunities of observing, in the *post-mortem* inspection of those who had died of diseases, either immediately seated in the liver, or affecting other organs, the gall-bladder distended with a thick, viscid, and acrid bile, and the ducts running from the secreting granulæ of the liver through its substance to their principal trunk completely gorged with bile of nearly similar characters. In different cases, indeed, this secretion presented different appearances, as regards colour and consistence; but the engorgement of the ducts and gall-bladder was generally remarkable, without any apparent organic change sufficient to account for the circumstance. In the majority of instances, the outlet of the ducts in the duodenum was quite free, and their channels unobstructed, unless the viscidity of the secretion may be viewed as an impediment,*—an inference that seems by no means irrational. Where any obstacle existed, such as narrowing of the ducts, the impaction of calculi in them, or the existence of spasm,—the cause was then evident; but in the absence of all these, the only conclusion we could form as to the cause of this very frequent appearance, was, that the secreting functions of the liver may be so modified in a warm climate, that, in addition to an increase of the biliary secretion, this fluid itself may be retained and accumulated in those parts of the apparatus which admit of the retention. Attentive observation of the phenomena, marking the origin and progress of the diseases of the liver and bowels, and of the various types of fever, has further confirmed our opinion as to this particular point, and convinced us that this state of function actually obtains at the commencement and during the progress of these disorders, more frequently than is supposed, and is actually oftener present at these periods of ailment than in the last or fatal stage of disease; and that it is not only met with as a symptom or concurrent phenomenon in these disorders, but as an ailment *sui generis*, the disturbance observed in the system being the result of this cause, or arising from the irruption of the long-retained bile into the alimentary canal.

During an increased secretion of bile, if any momentary impediment come in the way of the flow of this fluid, either in the course of the

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* " We have frequently seen, upon the examination of bodies which had died of different diseases, the gall-bladder loaded with bile of a dark-green colour, and so thick and viscid, that it could scarcely be forced through the ducts by squeezing the gall-bladder, although a blow-pipe or probe would pass readily along them, shewing that the obstruction was then owing to viscidity alone. Doubtless spasm, or other more permanent obstruction, will frequently arise, as we shall have occasion to shew in the sequel."

common duct, or at its outlet, a copious regurgitation of it into the gall-bladder, and accumulation of it in the biliary ducts, must be the consequence; and if the obstacle placed in the way be either partial or complete, or of short or long duration, the accumulation will be in proportion to its extent and duration, and the copiousness of secretion. If the secretion be going forward abundantly, an obstacle, partial in its operation and of short continuance, will give rise to a great accumulation in the gall-bladder, and in the liver itself. If the secretion be natural, or even less than natural, a more complete or long-continued impediment opposing its discharge into the duodenum will have a similar effect. Thus, in recruits and other strangers to the climate, on their arrival in India, when the biliary secretion is much increased, *the temporary obstruction produced by exposure to currents of cool air, to wet, and by eating indigestible and hurtful substances, &c. often occasion the most formidable symptoms of disease, and when the obstruction is overcome, an immense quantity of vitiated bile is passed.* On the other hand, temperate persons, of regular habits and good conduct, are not so liable to these kinds of derangements, and suffer less severely from them when they occur. It is also reasonable to suppose, if the gall-bladder and ducts be over-distended with the accumulation of bile within them, that their vital contractility may be weakened, and that they will be the less able to re-act upon the distending power; and thus the evil will be increased, until that degree of constitutional disturbance be excited by the morbid distention, or until some internal or external cause supervene, which shall enable the organ to throw off the load which oppresses it, and discharge its morbid secretions."

What, we ask, becomes of the carbonic theory about the *increased secretion* of bile from atmospheric heat? Here we have currents of *cool air, wet, &c.* not checking the secretion, as it ought to do—no, it has not the least effect of that kind—it only checks, by some theory unexplained, the *exit* of the bile from the liver and gall-bladder. Now, the plain matter of fact appears to be, that the exposure to wet and cold checks both the perspiration and biliary secretion; and when reaction takes place—in other words, when these secretions are restored, there is a redundancy of both fluids, as a necessary consequence. We think it would be difficult to adduce a passage from any work, so pregnant with gratuitous assumptions as the following.

"The obstructions which generally *occasion accumulation of bile* in the apparatus concerned in its secretion and discharge, seem to be whatever suddenly *diminishes the vital influence of the organ* or the system generally; as exposure to terrestrial and morbid exhalations, sudden chills, the depressing passions, the use of cold fluids and ices when the skin is perspiring, &c. Spasm of the common ducts may arise from these and other causes, and produce more completely the same effect. *A weakened state of the digestive organs, particularly of the duodenum and stomach, may also be pro-*

ductive of accumulation of bile, by furnishing a copious supply of ill-digested chyle, abounding with the elements whence bile is formed; while, at the same time, the debility which these viscera experience extends itself to the gall-ducts and bladder; and the emulgent operation, usually produced by a healthy and active function of the duodenum, no longer takes place, or, if at all, in a lesser degree. *The accumulation of mucus on the internal surface of the duodenum may also obstruct the mouth of the common duct,* and prevent the flow of bile into the alimentary canal, until this obstruction be either overcome or removed."

But enough of hypothesis. The signs of accumulation in the gall-bladder or biliary ducts, cannot always be depended on, especially when viewed separately; but, taken in connexion, Mr. A. thinks they may be duly estimated by an experienced practitioner.

" The earliest symptoms of which the patient generally complains, when he attends to his sensations and state of health, are, clamminess and foulness of the mouth, fauces, and tongue, with a bitter taste, particularly in the morning; a sense of distention and weight at the epigastric region and at the præcordia, frequently with a sense of coldness and sinking in the same situations; slight anxiety; acid and acrid eructations about three or four hours after a full meal, with painful fulness at the epigastrium, and difficult digestion. The patient often complains of headach, pain in the back or loins, uneasiness under the shoulder-blades, fulness and pain in the region of the liver, particularly when pressure is made at the time of his taking a full inspiration; and of aching in his knees, shoulders, and limbs; his countenance being pale, sallow, or muddy, and the conjunctivæ more or less tinged of a yellowish hue. The state of the pulse is different in different cases. It is often slow and full, and sometimes it is irregular in frequency and strength; occasionally it intermits, and not infrequently becomes quick, but oppressed upon the least motion or exertion. The urine is generally high-coloured, and depositing a brownish sediment. The stools are often costive, sometimes light or clay-coloured, and frequently tenacious. When the accumulated bile is discharged into the alimentary canal, much constitutional disturbance then generally arises, according to the qualities which this fluid may have acquired from its retention. The pulse now becomes quick, and often irregular; vomiting and purging, with griping, pain, and anxiety, often supervene, sometimes with spasms. Thirst becomes urgent, and the tongue, which was before foul, is now excited, often dry, and its papillæ large, distinct, and erect."

The ultimate *effects* of these accumulations and subsequent overflowings of vitiated bile, will be various in different individuals. In one it will produce simple bilious diarrhœa—in another, sporadic cholera—in a third, simple dysentery, or inflammation of the bowels, or even the stomach, when the bile regurgitates into that organ. In some instances, though not very

frequently, the inflammation will be found confined to the duodenum, as was verified by the following case and dissection.

" A female, leading an irregular life, came into hospital complaining of all the symptoms of bilious accumulations of a morbid character, with much debility, a broken-down constitution, quick, feeble, and fluttering pulse, nausea, and vomiting of dark-green bilious matters, slight purging of dark bilious and fluid motions, coldness of the surface, sunken countenance, and pain and anxiety at the pit of the stomach and right side. Blisters were applied to the epigastrium ; laxatives with ammonia were given internally, and enemas of an aperient and cordial kind thrown up. She died soon after admission, and the body was inspected within twelve hours after death. Upon examining the alimentary canal from the œsophagus to the rectum, and exposing its internal surface throughout, the duodenum was found highly inflamed from the pylorus to the jejunum, the upper portion of which latter was also inflamed. A part of the duodenum, a little below the entrance of the ducts, was sphacelated. A few red points were observed in the stomach and other parts of the alimentary canal ; but these were not more numerous or extensive than what are often remarked in cases of death from diseases in which the functions of the alimentary canal were unaffected. The portal veins were turgid ; the liver somewhat enlarged. There was no other morbid appearance."

The presence of vitiated bile in the duodenum sometimes occasions an alarming state of depression and prostration of the vital energies—especially in nervous and melancholic temperaments. Mr. A. thinks that, in those cases where the natural functions of the bowels have been impeded by accumulations of viscid bile, " the irruption of morbid bile is productive of much less constitutional disturbance, and is even beneficial, inasmuch as it detaches this matter from the mucous surface, and leaves it free and unencumbered in the performance of its functions." Cases in illustration of biliary accumulations are detailed, and the author next proceeds to a new section.

CONGESTION OF BLOOD IN THE LIVER.

This Mr. A. supposes to be a much more frequent occurrence, in this as well as in tropical climates, than is imagined. He conceives that it is present in the early stage of the majority of febrile diseases—particularly those which are idiopathic—and that it is not generally overcome until after the stage of excitement has been fully formed. The rationale of this state of hepatic congestion is substantially the same as was given by Dr. Johnson many years ago—namely, the peculiarity of the portal circulation, with reference to the general circulation. Mr. Annesley conceives that this hepatic congestion not only plays an important part in fevers and many other intertropical diseases, but leads to hepatic inflammation, the great scourge of Europeans in India.

"We have already alluded to the existence of congestion of the liver, during the progress and decline of other diseases. This is particularly remarkable in the history of the dysenteries of India, and in the remittents, intermittents, and continued fevers of that country, and, indeed, of other intertropical regions. Even in the dissection of those cases which terminate fatally, whether from fever of whatever type, from dysentery, from cholera, either simple or epidemic, or from disorders of the other abdominal viscera, and even in those more particularly affecting the head or chest, great congestion of the vessels of the liver is not infrequently observed. Nor can the appearance be considered more the consequence of death, or of the changes immediately preceding dissolution, than previously existing disorder; for the attentive observer may often remark the signs usually characterising congestion of the liver, during the life of the patient, or may trace an obvious connexion between this condition of the viscus and the disorder of which the patient died."

The anatomical characters of this congestion of liver are well illustrated by plates, which, from the size and price of the work, are unfortunately beyond the reach of the profession generally. We may shortly state that the viscus is usually much increased in size, particularly the right lobe, and in a direction upwards into that side of the thorax, forming a large segment of a circle. The colour of the organ is generally changed by the congested state of its vessels, and seems to depend on the particular sets of vessels which are the seat of this plethora, and also on the absence or co-existence of accumulations of bile in the ramifications of the hepatic ducts.

"In some cases, the surface of the liver is of a darker brown than natural, almost amounting to black, greenish-black, or bottle-green, and this deep colour in some instancés passes very abruptly into a reddish or light-brown tinge. Sometimes the surface of the congested liver is variously mottled, or marbled, and occasionally it is streaked and clouded, of a yellowish-brown, greenish-black, or yellowish-green hue. These shades of colour are generally more remarkable upon its upper or convex surface, but they are often observed upon the concave surface, and are quite independent of any effects which may have been produced by the bile contained in the gall-bladder. Sometimes the surface of the liver is very dark; and yet, upon cutting into its substance, the subjacent texture is of its usual colour.

When cut into, the substance of the liver is, however, generally darker than usual, and gives out a large quantity of dark fluid blood; but in regard to fluidity there is much difference, according to the period which has elapsed from the time of death to that of inspection. In India, where the *inspectio cadaveris* is usually made a few hours after death, the blood is observed, in cases presenting congestion of the liver, of a fluid, or semi-fluid, or thick consistence, and of a very dark colour. The portal vessels

and the hepatic veins are the seats of congestion, and it is often difficult to say which of the two sets of vessels presents this appearance to the greater extent or more frequently; but we believe that the hepatic vein is more generally congested in the greater degree. In many cases, the congestion of the blood-vessels and accumulations of bile in the biliary ducts, although existing to a great extent, are insufficient to account for the very great increase of the size and weight of the liver, shewing that these appearances are often connected with augmented size of the viscus, independently of the extent to which they could have increased its bulk, and of any organic disease. On some occasions, congestion and accumulation of bile have been considerable, without any very marked augmentation of size; but more generally, congestion of the blood-vessels, particularly when associated with accumulations of bile in the biliary ducts and gall-bladder, gives rise to increased size of the liver; and such increase is often in relation to the extent to which congestion of the blood-vessels and biliary ducts obtains."

The appearances of the bile are various. Sometimes it is pale, deepening, in different subjects, from a straw colour to an orange—and from that down to yellowish green—green—dark bottle-green, &c. In the lighter shades the bile is generally most fluid, and *vice versâ*. Upon making slices of the congested liver, the divided mouths of the distended ducts appear rounded or oval, according to the direction of the incision—and, in some instances, small granular or miliary calculi are found in the ducts. In cases presenting the greatest degrees of congestion and biliary turgescence, the viscidity of the bile appeared to our author to have given origin to the formation of these small calculi in the substance of the liver. The cystic bile, in these states of congestion, is generally of a green colour of various shades and consistences.

The above morbid appearances are often seen accompanying organic diseases of this viscus.

The *symptoms* which denote, in the living body, these congested states of the biliary vessels, cannot be individually depended on. They must be viewed in connexion.

" When, however, the countenance is pale, anxious, inexpressive, sallow, of a dark or muddy hue; when the tongue is covered with whitish or yellowish-white fur, or otherwise loaded; when the bowels are costive, or when the stools are morbid, dark, and watery, with griping and tenesmus; when the digestion is difficult, attended with nausea, or when the appetite is diminished, and the patient complains of pain and oppression at the scrobiculus cordis, particularly after a meal, with flatulence, borborygmi, and oppressed breathing, and a difficulty of filling the lungs to their utmost; when the skin is cool, clammy, and foul, or of a dark muddy tinge, with irregular chills, sometimes approaching to rigors; when pain, fulness, weight, and oppression, are experienced in the re-

gion of the liver, and at the epigastrium, or across the shoulder-blades, or beneath the scapula, and have supervened suddenly; when the uneasiness in those situations is increased upon a full pressure and full inspiration; when the pulse is full, slow, and irregular, or when it is quick, but oppressed; when there is headache, restlessness, disturbed sleep, with unpleasant dreams; and when the urine is turbid, or presenting a muddy sediment,—we may infer that congestion of the vessels of the liver is actually present."

It must be remembered that all, or even the majority of these symptoms are not to be expected in the same individual, although many of them may be recognized in different grades. The state of the pulse is very variable, and not to be depended on. Mr. Annesley thinks that, although pain, oppression, weight about the epigastrium, or under the scapulæ, characterise, in general, inflammation of the substance of the liver, yet that these are often marks of congestion also—especially when they supervene suddenly, and are attended with many of the symptoms already described. Inflammation does not arise or reach its acmé in a few hours, but congestion may. Neither can pain, he thinks, be always considered indicative of inflammation, since the membranes of the liver are put on the stretch by congestion. The causes of this congestive condition of the biliary organ are those which have been already portrayed—high atmospheric temperature—too much animal food—too highly seasoned dishes—" indolence and insufficient exercise in the open air "—inordinate use of spirituous liquors.

TORPOR OF THE LIVER.

We were rather surprised to find this section rise in view, after the brilliant doctrine of increased secretion of bile on carbonic acid principles. The torpid condition of this apparatus, however, could hardly have escaped the notice of Mr. Annesley, though he appears rather at a loss to account for the phenomenon. After a great deal of physiological and pathological speculation, we come to the pith of the business, in the following short passage.

" Torpor of the liver, then, may arise simply from a diminished or exhausted energy of the secreting functions of the organ; and, from this state, complicated with accumulations of bile in the biliary ducts and gall-bladder, and with congestion in the blood-vessels of the organ; the former state of disorder gradually superinducing, and becoming complicated with, the latter derangements."

Torpor of the liver, Mr. A. observes, is generally complicated with dyspepsia—" and not unfrequently originates in that disorder." As the increase of the secretion was accounted for by the diminished production of carbonic acid gas in the lungs, we wonder that Mr. A. and Dr. Copland

did not try to connect the diseased secretion with some modification of the same doctrine. Instead of the carbonic theory, the following explanation is given, which indicates that the doctrine of sympathy was not entirely annihilated in their minds.

" Over-excitement, also, of the perspiratory functions, from long-continued marches, fatiguing exercises, and too warm clothing, is not infrequently productive of considerable exhaustion of the secreting actions of the liver, and often disposes it to torpor, venous congestion, and accumulations of bile in the biliary ducts, *upon the slightest exposure to cold, to moisture, to the impression of malaria*, and when the depressing passions are brought into operation, or when hurtful or indigestible matters are taken into the stomach."

Whether those exposures to cold, moisture, malaria, &c. do not influence the cutaneous secretion, we leave to our readers to determine. The symptoms indicative of this torpid state of the biliary organ are next delineated. It is acknowledged that these symptoms are not always so unequivocal as could be wished.

" If, however, we find the patient to complain of want of appetite, drowsiness, with pain over the eyebrows, lowness of spirits, and hypochondriacal feelings, dark and high-coloured urine, a costive state of the bowels, and pale or clayey motions, a dark or sallow countenance, wasting of the flesh, slow and painful digestion, with the symptoms noticed in a previous section as constituting diminished function of the stomach, flatulency, particularly of the bowels, without any evident fulness or enlargement in the region of the liver, but with a bitter or disagreeable taste of the mouth, and a loaded state of the tongue, particularly in the morning,—we may reasonably infer that the functions of the liver are inadequately performed; but it is by no means so easily to be determined whether or no such torpor is the result merely of diminished function, or of change of the structure of the organ, unless we are acquainted with the patient's habits and the nature of his former ailments. When the foregoing symptoms occur in one addicted to the use of spirituous liquors, or in one who has resided long in a warm climate, and suffered former attacks of hepatic disease, then the latter alternative may be more reasonably inferred."

After detailing a sufficient number of cases illustrative of this torpid state of liver, Mr. A. proceeds to the treatment of these functional disorders of the biliary apparatus. This may be summed up in a very concise manner. Where plethora exists, and the patients have been living too free, bloodletting is recommended, as the first step—and local depletion afterwards, if necessary. The antiphlogistic system should be strictly adopted, and the bowels to be kept well cleared by purgatives. Where sickness and bilious vomitings obtain, warm water is ordered, and afterwards a brisk dose of calomel. Even when all the morbid secretions are

cleared away, Mr. A. recommends a full dose of mercurial at night, with aperient draughts in the morning, with the view of changing the secretions of the liver, and effecting a healthy flow of bile. If the mouth becomes affected, under this treatment, " a healthy state of function of the liver is the more likely to supervene speedily." It is not the object, however, of Mr. A. to affect the mouth by mercury. In many cases, where the rush of vitiated bile into the duodenum occasions distressing symptoms, cordials will be necessary before the purgative plan is put in force. In respect to that form of disorder, which has been termed torpor of the liver, Mr. A. found a full dose of calomel at bed-time, followed by a bitter aperient medicine in the morning, the most beneficial practice, with blisters over the epigastric or hypochondriac regions. After a few days of this treatment, the pilula hydrargyri combined with the pil. alois. cum myrrha, is prescribed at night, with the bitter aperient in the morning. The practitioner is warned against the exhibition of tonics and stimulants for the apparent debility which accompanies these biliary derangements.

ACUTE HEPATITIS.

Hepatitis is a word which almost universally, in this country, calls up the idea of a hot climate, and especially the climate of India. There is hardly any acute inflammation less common in Europe than that of the liver—none so frequent as this phlogosis in our Asiatic dependencies. The reasons why hepatitis should prevail more generally in India than England have been discussed, but not finally adjusted. Some place the etiology of the disease to the account of atmospheric heat—some to a specific miasm, peculiar to India—and others to the luxurious living of Anglo-East-Indians. It is probable that the same miasm which produces jungle, marsh, and the whole tribe of remittent and intermittent fevers, gives origin also, in many instances, to dysentery, cholera, and hepatitis.

Mr. Annesley observes that—" inflammation of the liver generally *supervenes*, either as a *primary* disease, without any very apparent state of previous disorder, or as a consequence of one or more of the functional derangements, &c." We notice this opening sentence of the section, to shew how fond the author is of words, and how little he cares about their meaning. How can hepatitis *supervene* as a *primary* disease? If it *supervenes* at all, it must supervene on some other disorder. Even the latter part of the sentence is clumsy, if not incorrect. If inflammation of the liver is a mere *consequence* of functional disorder, the word supervene is still an inappropriate one. We seldom indulge in verbal criticisms; but the work under review certainly requires much *verbal* expurgation.

The right lobe of the liver is more frequently inflamed than any other

part—the left lobe less frequently. The parenchymatous structure, in Mr. A.'s experience, is much oftener the seat of phlogosis than the coverings of the liver. Frequently, indeed, we find the substance of the liver destroyed by inflammation or abscess, without any appearance of phlogosis on the surface.

Inflammation of the substance of the liver seldom commences with a well-marked rigor or chill, unless after exposure to a powerful exciting cause operating upon the system from without, as cold or wet, currents of air, night dew, or malaria. When chills or rigors mark commencing inflammation of the internal structure of the organ there are generally one or more of the symptoms we have enumerated as characterising congestion also present. Indeed, a congested state of the organ about to be diseased always accompanies that particular condition of system which gives rise to rigors, if it does not actually cause this particular phenomenon; and it generally accompanies inflammation of the substance of the organ, to a greater or less extent, throughout its progress. The patient usually complains, about this time, of oppression, weight, and uneasiness about the pit of the stomach and right hypochondrium, extending sometimes under the ensiform cartilage, and in the direction of the diaphragm and mediastinum to the back and shoulder-blades. These symptoms are usually increased upon a full inspiration, taken at the time when pressure is made beneath the ribs, or when pressure upon the stomach and back is made at the same time. The pulse is, at this very early period of the disorder, scarcely affected; but it soon becomes accelerated towards night; it is often slower and more oppressed than usual, and occasionally irregular or remittent. The countenance is now usually pale, sallow, or somewhat anxious; the spirits considerably depressed; the tongue yellowish, white, and more or less foul, and the patient complains of loss of appetite and of sickness, with an unpleasant taste in his mouth. The bowels are often irregular, but at first generally costive, and the urine is in small quantity, loaded and high coloured. There is sometimes headache, and generally a disturbed sleep, and often slight dyspnœa and sighing, with slight oppression at the chest and epigastrium.

As the disease of the internal structure of the liver advances, the pulse becomes quicker, fuller, and more irritable in its beat during the evening and night, and it is often oppressed and embarrassed during the morning and day, and sometimes throughout, unless copious depletions have been practised early in the disorder; the sense of uneasiness in the region of the liver and epigastrium is often augmented; and if vascular fulness of the organ be great, and particularly when the inflammation results from congestion, the patient complains of a heavy, dragging pain, increased on sudden motion, or by turning suddenly in bed. There is often a short suppressed cough, dyspnœa, with shortness of breathing, a catch in the respiration, particularly after quick motion. Upon examination, in these

cases, tumidity of the viscus may be often ascertained from its protrusion beneath the ribs and scrobiculus cordis. The easiest position is usually upon the back, or sitting gently bent forward. All these symptoms are generally increased upon taking matters into the stomach; and the pulse is now much accelerated, especially towards evening. Difficulty of lying upon the right side is not frequently present, and pain in turning to the left side is not often felt, unless the change of position be made suddenly. The tongue at this stage of the disease is generally coated, and of a yellowish or brown colour; it is frequently also dry, particularly at its middle. The pain sometimes complained of at the top of the right shoulder, and so improperly stated as being one of the chief signs of hepatitis, is, when present, certainly characteristic of the disease in the right lobe; but, unfortunately, this symptom is only occasionally present; and the inexperienced practitioner, who has been taught to look to this as a distinctive mark of the disease, infers, when it is not observed, that the liver is sound. With respect to the pain actually accompanying inflammations of this organ, we may state that it is often felt in the region of the liver, in the lower part of the thorax, and in the epigastric region: it is sometimes referable to the top of the right shoulder, frequently to the right shoulder-blade, and occasionally to both scapulæ: it is, on some occasions, seated in the back, between the lower angles of the scapulæ, and, in some instances, the only pain which has been complained of has been in the loins. We have observed it, in a few cases, in the right clavicle and its vicinity; and in others, in the left shoulder and shoulder-blade only. In many cases, pain is increased in the situation of the disease or its vicinity, upon quick motion, upon making a false step, or upon turning suddenly from one side to the other; and, in a few obscure cases, pain is complained of only on such occasions. When the internal structure of the organ is affected, the pain in the hypochondriac and epigastric regions is seldom acute; there is most frequently a sense of aching or dragging, with oppression at the præcordia. Pain is seldom acute, tensive, or pungent, unless the surfaces or ligaments become affected. There is usually great anxiety at the epigastrium and præcordia, accompanied with frequent sighing, particularly when pressure is made simultaneous on the right hypochondrium and under the right shoulder-blade. We have seen a few cases where pain followed the course of the muscles of the right side of the neck; it often extends from under the ensiform cartilage, in the direction of the mediastinum, to between the shoulder-blades; and when this is observed, oppression, dyspnœa, or a sudden catch in breathing, and a dry cough, generally accompany it. Pain frequently, also, extends from the right side, under the shoulder-blade to the spine, where it terminates. On many occasions, when great congestion of the vessels of the liver seems to accompany inflammation of its substance—states of the organ which, as we have already said, are frequently co-existent—the right lobe

becomes very much enlarged, and rises up into the right cavity of the thorax, occasioning great oppression at the chest, fulness at the epigastric region, dyspnœa, frequent dry cough, and sometimes acute pain, owing to the great distention of the covering of the liver at this part, with an increased discharge of mucus from the bronchi. In such cases, the exacerbation of pain in the chest, upon a full respiration or on coughing, the flushed or tumid state of the countenance, occasioned by the interrupted circulation through the lungs and the seat of the complaint, are apt to make the inexperienced practitioner mistake the disease for pneumonia. In cases of this description, there is generally more or less pain or uneasiness felt about the shoulder-blades, or top of the right shoulder, or between the scapulæ; and often numbness of the right arm, with pain about the insertion of the deltoid muscle, or at the wrist, is complained of; rarely, a slight numbness or pain is also felt down the right hip."

Nausea and vomiting are often concomitants of the more acute attacks, and generally indicate that the inflammation is seated near, or is extending to the stomach, or in the direction of the ducts. This more usually happens when the inflammation results from accumulations of vitiated bile.

" In such cases the patient complains of sense of fluttering, weight, and fulness at the right hypochondriac and epigastric regions—sometimes of pain in the abdomen—and he reclines chiefly on the left side; the stools are generally watery, frequent, scanty, and very dark-coloured, with tenesmus, and many of the symptoms of dysentery, for which disease it is often mistaken. Even when but little sickness at stomach is present, there is always loss of appetite in the more acute forms of the disease, heartburn or gripes about an hour or two after a meal, and considerable thirst, with low spirits; and the patient often reclines upon the back or left side, in preference to any other position."

As the inflammation advances, the fever, and especially the evening exacerbation, becomes more marked—the tongue is generally covered with a white or yellowish-brown fur—moist in the beginning, but dry in the advanced stages. In cases where the hepatitis has supervened on previous disorder of the alimentary canal, or after repeated attacks of hepatic disorder, " the tongue seems often smooth and glossy, marked by fissures, and lobulated." These are bad signs. The bowels are generally much disordered—the motions being vitiated, scanty, slimy, watery, or of a dirty brown colour. The thirst is urgent, and the nights are restless.

" The state of the countenance and skin deserves attention during the progress of disorder. At its invasion, particularly when attended with chills or rigors, the countenance is pale or sallow, and the skin shrunk and pale on the extremities, but often natural in the trunk. As the inflammatory action becomes developed, the countenance fills out more fully;

and when there is great fulness and oppression in the region of the liver and chest, the face often becomes fuller than natural, with some degree of dusky redness in the cheeks. The countenance and eyes, however, still possess a murky, or muddy, or sallow hue, and more or less of a dark circle surrounds the eye, particularly beneath it. The tunica albuginea is either of a yellow tint, or of a dull white or pearly hue. The patient often complains of pain in the forehead and over the eyes. The skin on the trunk, especially towards evening, is generally warmer than natural, and is sometimes attended with a greasy feel, and a scanty or partial perspiration. When perspiration is copious, it is frequently very offensive. A certain degree of jaundice is often remarked in the hepatitis of Europe, especially when it terminates in abscess; but jaundice is not a frequent concomitant of hepatitis in India, unless when the ducts or gall-bladder become involved in the disease, or when it supervenes to biliary calculi and obstruction of the ducts. The countenance and eye are, however, always deficient of clearness, and possess a sickly expression."

The urine is high-coloured, scanty, loaded, and produces a sense of scalding when passed. A dysenteric state of the bowels is a common concomitant—and healthy bile is hardly ever found in the stools. Mr. A. observes, what no practical man will doubt, that there is no *one* symptom or phenomenon on which we can depend, as pathognomonic of active inflammation in the liver—and he might have added, of inflammation in any other internal structure.

When the surface of the liver becomes inflamed, whether primarily or secondarily, the symptoms assume a more acute and definite character.

" Febrile signs are more prominent, and often supervene to slight rigors and chills; the pulse is generally much accelerated, and hard; the pain in the right hypochondrium is more or less acute; and when the upper surface of the right lobe is affected, or when great tumefaction of this part is present, so that it rises up into the chest, considerable pain and tension are also felt in the right thorax and under the ensiform cartilage and sternum, so as to resemble an attack of pleuritis. There is also cough, much increase of pain, or a catch, upon a full inspiration, or upon pressure, especially when made at the time of a full inspiration. When the whole of the upper surface of the organ is the seat of inflammatory action, the attack may be mistaken for pneumonia. The oppression, difficulty of breathing, pain in the course of the diaphragm and under the sternum, being generally considerable."

The heat and dryness of skin and tongue are also greater in the membranous than in the parenchymatous inflammation. The secretions from the bowels are very variable in this form—generally they are diminished in quantity, and sometimes deficient of bile. Diaphragmitis is not unfrequently superinduced in this form of hepatitis, from extension of the inflammation—and the lungs also are not uncommonly inflamed, attended

with great tension in the hypochondria and inconvenience in breathing. The cough is hard, frequent, and suppressed as much as possible by the patient. When the outer surface of the right lobe is inflamed, the patient lies best on that side, and has pain extending round to the right scapula—sometimes to the shoulder. On the other hand, when the concave surface of the organ is the seat of inflammation, the functions of the stomach are prominently disturbed.

"Nausea and vomiting are often present, particularly a few minutes after substances are taken into the stomach. The thirst, anxiety, and pain at the epigastric region, are urgent, and there is usually much pain in the back, and sometimes in the right shoulder and muscles of the right side of the neck. The pulse is variable, but generally irritable, quick, small, contracted, or hard. There is often felt a sense of fluttering at the scrobiculus cordis, with a heavy dragging pain in the same situation; anxiety and frequent sighing; and sometimes, in the advanced state of the disease, hiccup is present, especially after cold fluids are taken into the stomach. The patient generally reclines upon the left side, or leans gently forwards. All these symptoms become more urgent if the inflammatory action have extended to the gall-bladder, to the ducts, or to the stomach itself. When such is the case, there is generally a sense of burning felt at the epigastrium, with fulness, frequent and painful eructations of flatus, very quick pulse, with cold, clammy hands, and increased heat of the trunk. The vomiting is frequent and painful, the urine in small quantity, and the stools watery, scanty, and often morbid and offensive. When the ducts and gall-bladder are affected, the pain is felt darting to the right side and back, and from under the ensiform cartilage, in the course of the mediastinum, to the spine; sometimes it extends from the epigastrium to the umbilicus, and back to the right hypochondrium. Singultus and acrid eructations not infrequently also supervene as the disease advances, particularly after substances are taken into the stomach. The patient can seldom bear pressure on the right side and epigastric region, and feels increased uneasiness upon a full inspiration. Increase of uneasiness merely cannot, however, be considered as a distinctive sign of the seat of the inflammation, as this function is more or less affected, particularly on attempts to fill the lungs, in all the stages and forms of the disease: the degree, however, to which the breathing is affected, and the seat of pain or uneasiness, upon taking a full inspiration, is often a guide to the actual state of disorder. A similar remark may be applied to the pain and uneasiness frequently felt upon making a forced expiration: for this means of ascertaining the seat of pain ought always to be practised, whenever the exact nature of the case is in any way doubtful. There are also observed great restlessness and want of sleep, a foul state of the tongue, with large, foul, and brown papillæ. If the tongue become clean from the treatment, the papillæ generally remain long excited or prominent."

It is but seldom that the left lobe of the liver is alone inflamed—and indeed it may be said that membranous inflammation is seldom unaccompanied by an extension of the phlogosis, more or less, into the substance of the organ. The symptoms will then, of course, partake of the characters peculiar to both forms.

PATHOLOGICAL APPEARANCES.

Excepting where people die of other diseases, as fever or dysentery, it is seldom that the pathologist has an opportunity of observing the appearances presented by the early stages of hepatitis. When such opportunities do occur, he often finds some part of the surface or interior of the organ evincing the usual signs of phlogosis—vascularity, redness, gelatinous coatings on the *surface*—increased vascularity, redness, and friability or softness in the recently inflamed *parenchyma*.

" In some instances, the surface of the inflamed organ is variously shaded. Sometimes, it is marked with red, brown, brick-coloured, greenish-brown, and even with almost black spots and streaks, while the internal structure is inflamed, congested with blood, much tumefied, and softer than natural. Upon making a section of the viscus with a very sharp scalpel, and after wiping with a sponge the cut surfaces, they present a lighter coloured reticulum, or mesh, studded with red or brick-red granulæ, and the divided ends of blood-vessels and biliary ducts. Upon being torn asunder—which is generally done with more facility in the acutely inflamed state, although sometimes with more difficulty in the chronic conditions of disease—the torn surfaces exude a greater quantity of fluid blood, but still retain their minutely granulated structure, and present both a brighter and a deeper colour than in their healthy state. When abscess forms in the substance of the organ, then the appearances become very materially and very variously altered."

Gangrene has been remarked by many writers and teachers—but our author, whose opportunities have not been exceeded by any other practitioner, never saw a case of the kind. It is probable that the black congested and softened state above-described, has been mistaken for gangrene. The inflammation and its consequences frequently spread, of course, to the neighbouring parts, and the stomach, duodenum, colon, lungs, and even the kidneys, are often involved in the destructive process. Sometimes the liver is found tumid and congested—the ducts either choaked with inspissated bile, or reduced to an impervious cord. This constriction of the duct appears, in some cases, at least, to be the result of spasm—in others, of organic change from preceding inflammation. Our author very properly enjoins a careful manual and ocular examination of the region of the liver in all cases.

" Manual examination should, therefore, be resorted to on every occa-

sion; and the trunk of the body should, in all cases, be exposed to the view of the practitioner, in order to ascertain if fulness or bulging exist in any part of the hypochondrium or in its vicinity. When manual examination is being made, one hand of the practitioner should be pressed at first gently upon the part between the base of the right shoulder-blade and the spine, whilst with the other he endeavours to detect, gently, delicately, and with refined tact, tenderness, fulness, or distention, either beneath the right false ribs, at the epigastric region, to the left of this region, or between the right hypochondrium and umbilicus. The state of the intercostal spaces should also be examined on the right side; and if pain be complained of in any of these situations, its nature may be inquired into by careful and varied pressure, whilst counter-pressure is being made on the back, in the place pointed out. The patient ought also to be made to breathe fully at the time when this examination is going forward, and he may be directed to bend, or move his body in various directions. If fulness, tumefaction, or distinct tumor, be felt, the practitioner should endeavour to ascertain their nature by gentle and varied pressure with the points of the fingers; and the existence of tenderness, the degree of tenderness, the depth at which it seems to be seated, and the presence of fluctuation, whether obscure or palpable, ought to be inquired into with as much dexterity as the practitioner can command."

ETIOLOGY.

Among the first causes of hepatic inflammation, Mr. A. places all those which "disorder the functions of the stomach, and at the same time derange the circulation in the biliary organs." This vagueness of expression is not much cleared by what immediately follows:—"These are whatever directly or indirectly produces a plethoric state either of the vascular system generally, or of the digestive organs, with debility." In a subsequent page we have a more tangible catalogue of the causes which produce hepatitis in our Eastern possessions. These are, full living, especially on animal food—high-seasoned dishes—high temperature—moisture—malaria—neglect of the bowels—indolence—puberty—wine—insolation—depressing passions, and all the various causes of dyspepsia.

It is curious that the age of puberty seems to be so operative in disposing to hepatitis. The disease is seldom or never met with amongst Europeans before that epoch. There are many circumstances, however, which call into play the various causes of gastric and hepatic affections after the age of puberty, which were previously inoperative. Among the causes enumerated, Mr. Annesley dwells strongly on the effects of bad water. The depressing passions are consequences and causes equally of the disease in question. The influence of atmospheric heat in the production of hepatic derangements is now acknowledged almost universally; and it is

on this principle chiefly, that we can account for the comparative frequency or infrequency of the disease in different parallels and localities of our Indian empire.

"A varied observation in different provinces in India has furnished us numerous proofs in illustration of the very extended influence of this cause amongst the natives of temperate climates; and we need only refer to the Abstracts of the Returns (given at p. 110 *et seq.*) and in the Appendix to the present Volume, for proofs of this influence on an extended scale. In the Carnatic, the prevalence of hepatic disease is well known: here the range of temperature is much higher than in any other part of India; the fall of rain is also very much less than in the provinces under the Bengal and Bombay presidencies; and the soil more naked, more gravelly, and less retentive, than in the latter: hence the great heat is not so frequently nor so adequately abated; and the cooling effects of a fall of rain sooner cease. Whilst the provinces under the Madras presidency are near the equator, several of the other districts of the British empire in India are situate beyond the tropic; and thus, from latitude, and the various peculiarities of soil, situation, and climate, the Carnatic and several other provinces in the Indian peninsula possess a much higher range of temperature, and a proportionately greater liability to inflammatory affections of the liver. It is sufficient for us to express the result of our own observation respecting the matter, since the same fact has been very justly stated and illustrated in Dr. James Johnson's valuable work on tropical diseases, which is deservedly in the hands of every practitioner in warm climates."

A series of very instructive cases of acute inflammation of the liver are here introduced by Mr. Annesley. One case will be sufficient to illustrate the treatment of acute hepatitis, to which we shall next proceed.

"*Case.*—Richard Kelly, (had been several years in India,) was admitted the 15th March, 1817, with the symptoms of congestion of the liver and accumulation of bile. These were removed by an emetic and purges. Five days after his discharge he returned, and on the evening of the 22d, the following report of him was given in the hospital journals:—Attacked with severe aching pains in the loins, shoulder-blades, and right side; anxiety; cold partial sweats; foul and excited tongue; and quick pulse.—Apply twenty leeches to his side. Calomel, gr. xx. h. s. s.

23d.—The pain in his back and side is relieved; but he has still occasional pain under the ribs: he has also some pain in his right shoulder. Tongue white and excited; pulse 80, small, irregular, and irritable. The pain is increased on a full inspiration. Was purged in the night.—Twenty-four leeches to the side; and the mist. purgans, with half an ounce of sulphate of magnesia.—*Evening.* Pain of the side nearly gone, but he complains of soreness over his whole body; pulse 96; tongue dry, furred,

and excited; great thirst; stools crude and copious.—Calomel, gr. xx. h. s. Mist. salina febr. A blister to his side.

24th.—Stools crude and full of viscid mucus; pain in his side and shoulder gone; tongue white and furred; pulse 78.—Pulv. purgan. ʒjss. stat. Rub in ʒj. unguent. mercur. thrice daily. Pilul. hydr. cum calom. no. 1 ter die. Haustus amar. cum sennâ, ʒij. primo mane.

This treatment was continued during the 25th and 26th. The pulse became less frequent; his tongue cleaner; and his motions more natural. On the 27th, he had a slight return of pain in the night, beneath the fifth rib of the right side; but his tongue and stools were natural at the morning visit: his pulse 66; and his skin cool.—Twelve leeches were applied, and the pilul. hydr. cum cal.; the mercurial friction and haust amar. cum sennâ were continued.—*Evening.* Can breathe with perfect ease; no complaint.—On the 31st, the mercurial friction was diminished; the pilul. hydr. cum cal. was omitted; and five grains of blue-pill given every night; the saline mixture through the day; and a dose of the purging mixture early in the morning.

On the 2d April, he was perfectly well; his bowels, tongue, skin, and pulse, being perfectly natural. The blue-pill and mercurial friction were left off; and a dose of the purging mixture given occasionally. He was discharged on the 4th.

Remarks.—This case illustrates chiefly the connexion often existing between functional disorder and inflammation of the organ. The symptoms were clearly referrible, in this case, to the liver, and indicated disease affecting principally its internal structure. In this case there was no rigor at its commencement; and the pain of the shoulder was at first not present. General soreness, after the pain had been removed by depletions, was here complained of, and is a frequent symptom of inflammation of the internal structure of this important organ."

TREATMENT OF HEPATIC INFLAMMATION.

This is one of the most important subjects which a tropical writer can descant on—especially as there is some discrepancy of opinion, not so much in respect to the nature of the remedies, as to the extent of their application.

General and Local Bleeding.—Although this is the most powerful of all therapeutical agents, even between the tropics, yet it is not *there* practised to the extent which Mr. A. deems proper. This, of course, is owing to a lingering portion of ancient prejudice. The following are his sentiments on this head.

" We can truly say, as respects the different forms of inflammation of the liver, as they occur in India, that we have had occasionally to regret

not having practised bloodletting when it might have been attempted with hopes of success, or carried it sufficiently far to be really beneficial; but we have never found that mischief resulted either from its performance, or the extent to which it had been pushed. Numerous instances, on the other hand, have come before us where,—from early education, the indulgence of prejudices, an indifference to the examination of those who have died of this class of diseases, and, consequently, from an insufficient acquaintance with the nature and extent of disease which occasioned death, —sufficient vascular depletion had been neglected at that stage of the malady when it might have been most serviceable, and the formidable consequence of disease prevented."

Leeches in India are abundant, and of excellent quality—consequently, local depletion to any amount may be expeditiously effected. In the majority of cases, the local is preferable to the general bleeding—though the latter is indispensable amongst those who are fresh from Europe, full-blooded, and robust. Mr. Annesley ascertained that Indian leeches, on an average, extracted an ounce and a quarter each, besides what flows from the bites. In the active forms of hepatitis, then, and among recently-arrived Europeans, Mr. A. took one or two bleedings from the arm—the first carried to the point of making a sensible impression on the vascular system. When the excitement returned, from 16 to 30 leeches were applied to the right hypochondriac and epigastric regions. If the symptoms were not considerably relieved by these general and local depletions, the leeches were re-applied, and a large hot poultice laid over the bites, these last being stopped from bleeding previously. Mr. A. attaches great importance to the poulticing practice, especially where the hepatic disease is complicated with biliary derangement and dysenteric symptoms. The repetition of the local bleedings must, of course, depend on circumstances that require no detail here.

Among those who have resided long in India, local depletion will be generally sufficient, even in the most acute forms of the disease. With soldiers who have been addicted to strong liquors during their tropical services, depletion must be very cautiously employed.

Mercurials, Purgatives, &c.—When we consider how much the function of the liver is deranged before and during the attack of hepatitis—and how morbidly altered are its secretions, we cannot be surprised that purgation, and especially mercurial purgation, should be very generally necessary.

" For this purpose, we have generally prescribed, immediately after the first vascular depletion, a full dose of calomel, as this medicine appears to us the most beneficial in inflammatory states of the system, the most active in eliciting a healthy secretion of bile, and the most efficient in dissolving that viscid and tenacious secretion which covers the mucous coat of the

intestinal canal at the commencement of nearly all the disorders affecting the organs of digestion. Unless the patient has come under treatment early in the day, when we have given this medicine immediately, we prefer the exhibition of it at bed-time, as it will then not disturb the rest of the patient by its operation, and will have had time to produce is effects upon the secretions and secreting viscera before morning; when a brisk purgative should be given, in order to carry out of the system accumulated fæces, and those morbid secretions which the previous exhibition of the calomel had prepared for removal."

Mr. A. prefers the compound powder of jalap to other purgatives, for the above purpose—next to it castor-oil, and, lastly, the "black-draught." It is of great consequence in this complaint, that the patient should not be disturbed in the night—and, therefore, when the bowels are irritable, Mr. A. recommends an opiate—even when it is necessary to give calomel every night. The following observations are important.

"If the exhibition of twenty grains of calomel at bed-time, and a purgative in the morning, saline diaphoretics being given through the day, affect the mouth, which frequently happens when vascular depletion has been carried sufficiently far, ptyalism should be quickly induced; but after its supervention, mercurials ought to be laid aside for a time. The reason of our recommending the speedy induction of ptyalism after the mouth becomes affected, is an idea which we entertain respecting the influence of the constitutional effects of mercury upon inflammations of the liver; namely, that to induce the mercurial excitement of the vascular system, indicated by slight soreness of the gums, and to exhibit mercury or calomel in small quantities, frequently repeated with this view, is to keep up a state of slow inflammatory action in the secreting substance of the liver, which may of itself terminate in abscess; whilst, if the full operation of mercurial remedies be speedily induced, and ptyalism become abundant, a derivation from the seat of disease is occasioned to the mouth and salivary apparatus, the disease in the liver speedily subsides, and the functions of the organ are restored to their healthy state. We believe that much evil very frequently results from the general habit of giving too frequent doses of calomel, with a view of inducing the constitutional effects of mercury. Those who prescribe five grains of calomel every three or four hours, with this view, produce much greater irritation of the alimentary canal, are longer in obtaining their object, and exhibit much more calomel for the removal of the disease, than those who give twenty grains only at bed-time. This latter dose acts as a sedative to the irritable stomach in this disease, whilst smaller doses increase the irritability of this viscus when it is present, and often induce it where it was previously absent."

If bowel-complaint exist or supervene, one or two grains of opium are to be combined with the calomel, and emollient enemata should be thrown

up. In this way the calomel will soon affect the system, especially if vascular depletion have been sufficiently employed previously. Mr. A. is not an advocate for going on to the production of full ptyalism in those cases where the secretions become healthy before that event takes place, and the other symptoms subside.

"But if the secretions and stools still remain morbid; if any disorder can be detected, by a careful examination of the patient, in the seat of the liver or in the abdomen; if the tongue be not natural; and if the countenance be sallow or unhealthy,—the speedy induction of ptyalism will then often prove of service. If, however, we fail in inducing this effect in the course of four or five days, we shall generally find it detrimental to continue this plan any longer. The means by which the speedy induction of the mercurial action may be accomplished are various; but we have generally relied most upon mercurial inunction, performed thrice a day, with a combination of camphor with the mercurial ointment, the patient taking the usual full dose of calomel at bed-time, combined with James's powder, or antimonial powder and opium."

Ptyalism once fully established, the mercurials are to be discontinued, and gentle tonics combined with alkaline carbonates are to be administered, together with saline aperients.

In the subacute and less active forms of Indian hepatitis, the use of saline purgatives, alternated with mercurials and alteratives, will generally be sufficient, after moderate depletion. But these failing, "the practitioner should endeavour, in the manner stated above, to induce, as speedily as possible, the full effects of mercury."

Auxiliaries in the Treatment.—"There are very few remedies which are more deserving notice than the nitro-muriatic acid wash, and the internal use of nitric acid, in cases of acute hepatitis, after active depletions and mercury have been used: they promote the return of strength and the healthy establishment of the biliary secretion; and if deobstruent laxatives, with suitable regimen, be prescribed, and adhered to during their use, they remove obstructions, and promote a free circulation in the vessels of the liver. As a restorative of the energies of the system after mercurial courses, they have generally proved beneficial in our practice, particularly when conjoined with the cautious exhibition of gentle tonics, with light but nutritious diet, and suitable regimen."

On the complications of acute hepatitis with pleuritis, gastritis, and inflammations of different contiguous organs, it is quite unnecessary to dwell, since the principles of treatment cannot be misunderstood, after what has been already detailed. From this article, the English reader will be able to form a very correct idea of the practice of medical men in the acute and dangerous inflammations of the liver between the tropics. Mr. Annesley is a man of such ample experience, sound judgment, and scru-

pulous fidelity, that every thing falling from his pen is highly valuable. If I have regretted the costly manner in which he has cast his volumes, and the unnecessary minuteness with which he has treated most of his subjects, I can assure him that not one of his most ardent admirers entertains more unfeigned respect for his talents and industry than myself. I cannot help again suggesting to him the propriety of publishing the letter-press of these volumes in a more condensed and less expensive form, leaving the plates to be purchased by those who can afford the expense.

J. J.

XXI.—Remarks on the Deep-seated, or Suppurative Inflammation of the Liver in Bengal.

This is the most dangerous disease I am acquainted with, because of its insidiousness, and the total absence of urgent symptoms: the process which leads to destruction is here silent and rapid. It has not been sufficiently dwelt on by writers on the diseases of our climate. Amongst the better classes of society, the disease chiefly attacks the feeble of constitution, the lax of fibre, and fair of complexion: it often terminates the career of the old Indian. Amongst soldiers, it attacks men of all constitutions and ages. Females are far less subject to this as well as the other forms of hepatic disease than men; and women of the better classes are rarely affected, comparatively.

Whether existing in the older resident in Bengal, or the new-comer, the inflammation of the parenchyma of the liver, is generally a disease of the cold season, and caused by night exposure;—in short, by any means that determine powerfully from the surface to the internal organs.* I have seen cases where it was caused by the chilling thorough-draughts of our northern entrances to the Calcutta houses, after leaving a crowded room; and others, where it was occasioned by exposure before daylight for the purpose of hunting, especially in persons of irregular habits.

The disease is sometimes preceded by a perceptible falling off in the general health, such as emaciation, dry cough and embarrassed respiration, loss of appetite, with a muddy or sallow complexion; but it more generally comes on in the midst of apparent health. We seldom, indeed, see the patient till inflammation has actually commenced; when there is generally present a feeling of abdominal uneasiness, but more particularly of the epigastric region, and that of the liver, with some degree of fever, preceded by slight rigor, or ague; but all these are so trifling as too often to attract little of the patient's attention. Perhaps he applies to his physician on account of *diarrhœa*, supposed to be the result of error in diet: medicine affords some relief, and he proceeds in his ordinary occupations for days; or, when the action is more chronic, for weeks, though under great depression of the mental and corporeal energies; till at length, his altered appearance—hacking cough—permanently dry skin—invincibly rough, furred tongue, and morbid taste—all expressive of a suppressed and depraved state of the secretions and excretions—attract some more serious notice on his own part, or that of his family. The real nature of

* Besides affecting the balance of healthy action existing between the skin and the internal organs, cold seems to disturb the vicarious actions of the respiratory and biliary organs spoken of at pages 37 and 164.

the disease may still remain a secret to both patient and physician; and it may not be till actual tumor of the liver—a marked succession of rigors, or profuse and clammy sweats announce in audible terms the formation of abscess, that either party becomes awake to the impending danger; and then it is too late. A sense of uneasiness, amounting to dull pain, weight and oppression may or may not exist in the region of the liver, according as the disease is centred more or less deep in its substance, or in its upper convex surface; when the former exists, the symptoms are more than usually obscure and insidious: in the latter case, they are acute.

It is seldom we have pain in the shoulder.

I should say that a rigor, or a diarrhœa, followed by slight fever—the peculiar state of the skin—the tongue having the roughness of a coarse file, with adherent coating—together with the local uneasiness already described—cough—scanty and deep saffron-coloured urine—ought immediately to warn the physician of the suppurative inflammation which leads to hepatic abscess. The diagnosis will receive material assistance from the external examination of the chest, especially when the upper convex surface of the liver is the seat of disease.

It is almost needless to say how careful should be the examination of the abdomen.

Such, then, are the symptoms and most uniform succession of events in this formidable disease: they should always meet with an early and strict attention, and the most prompt and decided treatment.

I will give a case in illustration. Last cold season a medical friend called at my house; and just as he was quitting, he said, incidentally, that he had a pain "*in his back, like lumbago.*" On examination, I found his liver seriously involved in disease, and that it had been so for three days, during which he had been living in his ordinary manner, and using the *cold* bath daily. All he had noticed was a slight shivering three nights previously, followed by feverishness and pain of the back; but he considered his symptoms of so little moment that his mention of them was obtained only through interrogation.

He was young and of robust habit; so that with the loss of about eighty ounces of blood within 24 hours, his symptoms yielded:—but I think he recovered with difficulty;—a few hours more, and it would have been too late. The above is an extreme case in point, the inflammation having been of a very acute character; but it is important, as shewing how very insidious are the symptoms, and how little they possess of the urgency to cause a salutary alarm in the patient's mind. It is always thus when the inflammation is centred in the parenchymatous structure of the liver; and hence the absence of acute pain, and those urgent symptoms which characterise inflammatory states of the peritoneal covering of the gland, which always give ample warning.

However long the disease may have existed, *provided there be no symp-*

toms indicative of suppuration, general bleeding—repeated as the symptoms may seem to demand—and copious in relation to age, health, and length of residence in India, must be instantly had recourse to; and the measure of depletion should be the sense of local and general relief, *with softening of the skin.* These are the only safe criterions of adequate loss of blood; and it should be continually held in recollection, that suppurative inflammation of the most deadly character is present, and that consequently there is no time to be lost. After the bleeding, calomel and antimony should be exhibited in large doses, with occasional smart purgatives in the intervals, until the system is brought mildly under the influence of mercury:—leeches and blisters are of course useful, but the latter ought not to be applied till a powerful impression has been made on the circulation and on the hepatic disease. The diet during the progress of treatment, and for a long time after, should be of the very sparest, such as thin sago or arrow-root. On a plan of cure such as this, I have seen cases of a very unpromising appearance end in health. Occasionally this has been finally effected by the steady use of the nitro-muriatic acid bath, persisted in for a month or six weeks.

The late Mr. Twining relied too much on bloodletting in hepatic disease, and too little upon other remedial means.

There are cases where inflammation will go on with a debilitated constitution and a weak pulse. What then is to be done? "What degree of depletion," says Dr. Billing, "would remove a node, or syphilitic iritis, without mercurial or other medicine? What would venesection do for rheumatic pains, without antimony, colchicum, opium, bark, mercury and other medicines? * * * * The question is not so much as to possibility, as expedition, and safety to the constitution."

Dr. Robert Jackson—no friend to mercurial treatment in tropical disease—admits that, "mercury, after the condition has been prepared for its action, is the principal means of cure where biliary secretion is principally in fault."

One other error it is necessary to correct;—namely, the supposed infrequency of the disease in Bengal: so much am I satisfied of this error that, taking the idiopathic cases of it, and those that form the complications with, or sequelæ to fevers and dysentery, the sum total of hepatic disease would form a respectable item in our bills of mortality; indeed, the statistical tables furnished in this report prove it.

Mr. Twining declares he has "never seen a case terminate in abscess, without our being able by a careful examination to detect the disease that is in progress, long before there was any reason to believe that suppuration existed." This I believe to be generally true; *but then, the examination must be most rigorous, and repeated daily until we are quite satisfied as to the true nature of the case;* for I remember that, in the cold weather of 1837 alone, I was called in consultation in four cases of suppurated

liver, in which no such condition had previously been suspected. A case occurred, under my own care, in which slight hepatic tenderness appeared in August, complicated with dysentery of a severe character. From this the patient recovered; and to restore his strength, he was sent to the Sandheads, where, having exceeded in diet, the liver again became slightly enlarged. A second time he recovered; but being of a weakly habit, and much reduced by disease and treatment, I recommended a voyage to sea. Here, a third time, despite the most carefully written instructions, he betook himself to habits of excess in eating, and to the use of wine. In course of three months from leaving Calcutta, an abscess discharged itself through the stomach, soon after which he died. I mention this case as affording an illustration of the necessity for abstinence, and to shew that, even when the hepatic affection is but secondary, it may, and very often does, prove the ultimate cause of death.

I recollect the case of a sporting Magistrate of this City, who returned from a hog-hunting party because of some feeling of indisposition. His death, which took place ten days afterwards, caused much surprise to his friends; and the medical attendant requested my presence at the post-mortem examination. In the substance of the liver we found several distinct abscesses, averaging from the size of an orange to that of a common nut. The case made a deep impression on my mind, on account of the utter absence of any symptoms indicating so much lesion; for I was then very young and devoid of experience in this fatal disease. Three years ago, a young Staff Officer called upon me, believing himself to be consumptive; his respiration and pulse were very rapid, with profuse night sweats; in short, he was dying of suppurated liver. The account he gave me was, that about six weeks previously, while driving to Barrackpore in a cold night from a Calcutta ball-room, he was seized with shivering followed by slight fever. He continued to perform the duties of his office up to the day of my seeing him, and the real nature of his disease had never been suspected. He died in a fortnight; and the entire substance of the liver was found converted into a huge cyst filled with pus.

Cases such as these could be cited in great numbers; but it is hoped that enough has been stated to shew the dangerous tendency of the disease, and its unsuspected frequency in Bengal.

Mr. Twining fancied that "a greater degree of *tension of the right rectus abdominis muscle*, than of the left," formed "one of the most undeviating symptoms of congestion with incipient interstitial deposit into the texture of the liver, which commonly goes on to deep-seated abscess."

The truth I believe to be that, the right rectus abdominis, like any other muscle in the body, will contract, more or less, according as any organ beneath its fibres is in a state of pain, no matter whether that pain be from inflammation or other cause; but that the mere tension of a muscle can

prove an "undeviating symptom" of any peculiar morbid change in a gland beneath it, cannot be admitted in any case; neither have I ever seen it confined to inflammatory or congestive states only. On the contrary, I know many persons, in whom it has been a well-marked accompaniment of that painful affection of the bowels, described by Dr. Johnson, and in whom it so continued for fifteen and twenty years.

Another fanciful doctrine has been started by Mr. Twining respecting the action of mercury in hepatic disease.

"We have been told," he says, "that mercury is beneficial in hepatitis, in the way that the breast-pipe or pump relieves inflammation of the female breast, when milk abscess is impending. But a legitimate parallel cannot be established in the action of the respective remedies:—the pipe relieves the inflamed breast by drawing off the superfluous milk, *without exciting increased secretion.*

Has the action of mercury an analogous effect on the liver?" No—and if it had but the limited effect of the pump or pipe, it would not be the valuable remedy physicians and surgeons have ever found it to be in so great a variety of inflammatory affections, and in the deadly inflammation of the liver in particular. It is for the very reason that calomel assists powerfully both in "drawing off" accumulations, and in procuring "*increased secretion*" that it proves of such value in aid of bloodletting. In short, it is by this very double action of purging and increasing secretion at the same time, that mercury relieves the loaded and inactive vessels of the diseased gland—not to speak of the other acknowledged influences of this mineral; such as—its increase of *all* the secretions and excretions of the body—its influence on the capillary circulation—its febrifuge effect—the peculiar specific power ascribed to it by Gooch, and other authors, as an antagonist to inflammations, whether general or local—its power over the absorbent function—its power of unloading, at the same time that it gives a new impulse to, the vascular system—its peculiar power in removing viscid and tenacious intestinal secretions—its alterative and solvent effects on the blood:—these are the uses and the actions ascribed to mercury by the ablest of our physicians and surgeons; and they are such as place this remedy second only in order to bloodletting, in all the more acute hepatic affections of India.

That mercury has been and is still *abused* by inconsiderate and ill-informed persons, is quite true; but to argue hence its *disuse* would not be wise.

It is of great practical importance that the real benefits derivable from this remedy should be impartially set before the inexperienced tropical practitioner, and I have here briefly endeavoured to do so in fairness to the subject, and to persons with whom I may happen to differ in opinion.

In the pride of pathological science, whereby we believe that, because we see and examine we therefore understand, we too often neglect the

science of pure observation, so inestimable to the physician; and thus, I think, it happens that matters are still in doubt amongst us, which a correct observation ought long ago to have fixed.

For the following table, exhibiting the geography of hepatic disease, I am indebted to Major Tulloch.

STATIONS.	Period of Observation.	Aggregate. Strength.	Inflammation of the Liver and Jaundice.		
			Attacked.	Died.	Proportion of deaths to admissions.
Windward and Leeward Command	20 years ..	86661	1946	161	1 in 12
Jamaica	20 ,,	51567	539	51	1 in 11
Gibraltar	19 ,,	60269	759	22	1 in 34
Malta	20 ,,	40826	857	47	1 in 18
Ionian Islands	20 ,,	70293	1168	58	1 in 20
Bermudas	20 ,,	11721	168	6	1 in 28
Nova Scotia and New Brunswick	20 ,,	46442	384	10	1 in 38 2/5
Canada	20 ,,	64280	488	12	1 in 40 2/3
Western Africa	18 ,,	1843	150	11	1 in 14
Cape of Good Hope	19 ,,	22714	496	25	1 in 20
St. Helena	9 ,,	8973	171	24	1 in 7
Mauritius	19 ,,	30515	2508	122	1 in 20½
Ceylon	20 ,,	42978	2382	213	1 in 11
Tenasserim Provinces	10 ,,	6818	488	29	1 in 17
Madras	5 ,,	31627	3372	190	1 in 17¾
Bengal	5 ,,	38136	2412	174	1 in 14
Bombay	5 ,,	17612	1084	62	1 in 17½

The above table, obtained by me two years after this article was written, is remarkable, as proving the frequency and fatal tendency of hepatic disease in the Bengal Presidency generally; and could we separate the results in the upper, from those of the lower stations, the greater frequency and fatality in the latter would be still more marked. The table proves also that, though diseases of the liver are somewhat more frequent in the Madras Presidency, they are more fatal in Bengal—a result but little anticipated by many who have been in the habit of considering this class of diseases as more peculiar to the South of India. The deaths by hepatic diseases among the European troops in garrison of Fort William are stated in the returns furnished me on the spot, at one in 18, while at Chinsurah, but 18 miles distant, they are one in seven;—at Berhampore, one in nine;—at Dinapore, one in six;—and, lastly, in the General Hospital Calcutta, one in nine. The high rates at stations so near, render it probable that some error may have crept into the estimate for Fort William. In the geography of this disease it is remarkable that, though there

exists so great an apparent similarity of climate between many portions of the Eastern and Western hemispheres, there should yet be so great a dissimilarity of result in the comparative influence on European constitutions; for in the East Indies, generally, Mr. Annesley estimates that 13 per cent. of the effective strength of British corps are attacked with hepatic disease; while, according to Major Tulloch's Reports, the proportion is but $2\frac{1}{5}$ per cent. of the effective strength in the Windward and Leeward Command, and 1 per cent. only in Jamaica.

J. R. M.

XXII.—Remarks on the Chronic Liver Enlargement.

This disease is by no means uncommon in Bengal, as the result of previously existing inflammatory states, more or less acute; congestions of the organ, or as the sequel to fevers both remittent and intermittent. The liver is generally enlarged in a perceptible manner; its function is greatly impaired; the biliary secretion being scanty and depraved; that of the kidneys being similarly affected: there is frequently a hacking dry cough —dyspepsia in various forms, and general ill health; sometimes a cachectic state with a sallow pasty complexion, and emaciation. The mind is despondent. The treatment of this disease is not well understood. Mercury I believe to be injurious; it injures the stomach and bowels, already overdrugged, without exciting any secretion from the organ chiefly affected, and on which this mineral, from repeated use, has lost its effect: purgatives of an irritating or drastic nature are equally injurious: in fact, it is often an unmanageable disease,—not readily amenable to treatment or change of climate.

The plan of cure I have generally had recourse to in such cases (observing great care in diet all the while) is, the nitro-muriatic acid bath, steadily persisted in for a month or six weeks at a time: it seems, like mercury, to act powerfully on both the excretory and absorbent system; and in the cases here spoken of, I do not know a better remedy. If we admit the absorption by the capillary veins and the absorbent vessels, and their conveyance of substances, rejected by the lacteals, directly into the vena portæ, to be transmitted to the liver, "where they undergo a true and proper digestion;" if we admit this "hepatic digestion, which is as real as that effected in the stomach and duodenum," we shall be at no loss to account for the powerful influence of medicinal agents exhibited in the manner of the nitro-muriatic acid bath.

When, from morbid dryness of the skin, the absorbents will not readily take up the acid, I direct the occasional use of the vapour or warm water

bath, with powerful friction of the whole surface, in order to stimulate the due functions of the skin.

Out of many cases that I have treated with advantage after this manner, I will only particularise the following: it was that of a gentleman of the civil service. The details are in his words; and when the patient is a person of education, I conceive this to be in all cases the preferable mode of describing a case, because we daily observe that "such is the nature of the human mind that cases *for* a preconceived opinion are retained" (and related too) "easier than those *against* it"—(Gooch). Were the example of Sir A. Cooper and others followed in this particular, medical cases would stand better with the profession as authentic evidence. "In November, 1829, I arrived in Calcutta, suffering from the consequences of a jungle fever contracted at Chittagong, my liver and spleen were perceptibly enlarged; my limbs were much swollen, and so stiff that I could with difficulty walk, and the least exercise occasioned vomiting. Before my arrival at the presidency, I had for months taken medicine—this plan was altered, and I was put through a course of the nitric acid bath, taking a vapour bath every other day. The nitric acid bath acted in a few days very powerfully, immediately on using it; and in about three weeks both the liver and spleen could no longer be felt, nor did pressure give me much uneasiness: the stiffness too disappeared, and my skin became less tense and dry. I took an aperient draught once or twice a week, and nothing else but the bath.—I left Calcutta towards the end of December for Simlah, and had little or no occasion for medicine for two years afterwards, my general health being completely restored."

I shall add nothing to the above case, beyond remarking that it was one of the worst I have seen. There was general anasarca from visceral enlargement; and altogether the danger appeared imminent. The result was as stated; and I am disposed to think, after an extensive trial of it, that the nitro-muriatic acid bath is not used so often here in these chronic cases as it deserves, and that, when had recourse to, it is often abandoned without just reason, and fails only from the imperfect or desultory mode of using it.

In the cold season of 1838, the same gentleman again visited Calcutta, in a singular state of disease:—there was an unnatural *dryness*, or suspended function of the surface of the body and of the mucous intestinal surface, with doughy enlargement of the abdomen, swelling of the hands and feet, and obstinate constipation—the excretions being deficient in bile, pasty and dry. The following detail is from the Surgeon of his station. "Arrived at his station in January, 1836, in tolerable health.

"During the first hot season the digestive organs were much deranged, with loss of appetite, obstinate constipation, distention and hardness of the epigastre, particularly after meals—acidity and flatulence. The complexion was sallow and pale, and, occasionally, he complained of a dull heavy pain

in the right hypochondrium. These symptoms continued till the cold season of 1837, when some improvement took place; but on the return of the hot season all the former symptoms recurred with increased violence, accompanied by excruciating headache, which for the time utterly deprived him of capacity to attend to the important duties of his office. Towards the termination of the rains the hands and feet began to assume a dropsical appearance. For many months he was compelled to take drastic purgatives almost every day, without which no movement of the bowels could be effected."

I put the patient again through a course of the nitro-muriatic acid and vapour baths, administering every morning a table-spoonful of saturated solution of Epsom salts containing a large proportion of dilute sulphuric acid. This at first had no effect, and he was obliged to have recourse to enormous draughts of castor oil, such as he had been using at his station for months previously.

Presently, however, the tumidness of the abdomen began to subside, the function of the skin to re-appear, and with it, a more ready action of the bowels from medicine, till in about a month, a dessert spoonful of the saline solution moved him; and before quitting the presidency, the bowels were, for the first time during twelve months, or more, moved without purgatives and through the use of the bath alone, the excretions being copious, dark and pitchy. In short, he found his health and spirits so improved that he wished to resume his duties, and return to his station; but, taking the severity of his illnesses, past and present, into account, I urged his proceeding to the Cape—the purpose for which he visited the presidency. I have dwelt thus long on the present case, because I consider it one of peculiar interest, from its severity; from the suspension of the excretory and absorbent functions, and their restoration by the bath, after the failure of "calomel, alterative courses of blue pill, combined with purgatives, ipecacuanha, strong irritating medicines, &c."—these are the words of the Surgeon.

In the indolent enlargement with torpid action of the liver, I have seldom found mercury of use. Along with a spare diet, and the repeated use of the acetum cantharidis to the hepatic region, the following formula has often appeared to do good in such cases, and is well suited to the abdominal fulness and torpor of the bowels induced by our cold season, and by the cold of Europe on first arrival;—

℞. Extract. Taraxaci ..... gr. xxxvj.
——— Aloes Pur..... gr. xij.
——— Colchici Acet.
Pulv. Ipecac..... āā gr. vj.
Ft. pil. xii. quarum capiat duas omni nocte.

When I prescribe the bath, I put the following directions in the patient's hands; and I have seen it reduce enlargements of both liver and spleen

when other treatment had, as in the above case, utterly failed of doing any good. Cases will sometimes occur, however, where the bath proves useless, and that I believe to arise from general debility, and a consequent inaptitude of the absorbents in particular.

The natives seem aware of the beneficial effects of acid treatment for the common tumid spleen, for which their doctors prescribe the undiluted sulphuric acid in doses of one drop given inside a plantain, or more generally, five drops in some cold water morning and evening.

Another plan of treatment is by a mixture of aloes, vinegar and garlic, with a small portion of the bazaar sulphate of iron (Kuzees): the latter is said to be very successful. I have cured tumid spleens at the Native Hospital, by a mixture of the tinctures of muriate of iron and of iodine; and the largest spleen I ever saw, I cured by the Iodide of lead alone.

The proportions of acid I use, are as follows, viz.:

Muriatic acid	3 oz.
Nitric	2 oz.
Water	5 oz.

Directions for preparing and using the Nitro-muriatic Acid Bath.

1st. Two gallons of water (about ten bottles) may suffice for a bath.

2nd. To each gallon of water add 3 oz. of the dilute nitro-muriatic acid by measure.

3rd. The bath thus prepared will keep in use for three days, by adding half an ounce of dilute acid and a pint of water, morning and evening, in order to make up for the waste by evaporation.

4th. A portion only of the bath to be heated for use, after which it is to be added to the remainder, so as to make the whole of a comfortable warmth.

5th. Let both feet be placed in the bath, while the inside of the legs and thighs, the right side (over the liver) and the inside of both arms are sponged alternately: this should be continued for ten or fifteen minutes morning and evening.

6th. While using the bath, a gentle aperient, such as Cheltenham salts, or Epsom salts in some bitter infusion, should be taken every other morning.

7th. Earthen or wooden vessels should be preferred as foot-baths, and all the sponges and towels to be kept in cold water, as the acid corrodes them.

There is a morbid condition of the stomach and bowels, well described by Dr. James Johnson, which is very commonly mistaken, both in India and in England, for hepatic disease, or enlargement: it is a mistake of consequence, in as much as the disorder is one of very frequent occurrence, and the treatment usually adopted is very injurious to health.

In both cases there is tenderness of the right side and epigastre, increased by pressure; but here the resemblance disappears. There are present, in the affection described by Dr. Johnson, none of the other symptoms characteristic of actual hepatic disease; and the tumidness, besides the difference in anatomical position, wants both the appearance and solid character of the real enlargement of the liver. Abdominal tumors, such as morbid growths of the omentum, or peritoneum, and fæcal accumulations in the colon, are occasional sources of mistake; but the situation and floating character of such tumors, together with the occasional and spasmodic nature of the attendant pain, will, in general, point to the true nature of the case. In the state of the stomach and bowels here especially referred to, there will frequently be found a red, inflamed, or excoriated state of the tongue, gums and fauces, indicating a highly irritable condition of the mucous digestive surface; the nervous and vascular systems are easily excited; indeed, there is occasionally a continuous acceleration of pulse, while at others, we have irregular attacks of fever, preceded by rigors; and the character of the concomitant dyspepsy is irritable. Purgatives are borne with great distress, especially when of an acrid nature; and calomel, so often resorted to for the cure of this supposed liver disease, is but rasping the already inflamed or irritated mucous membrane of the stomach and bowels, so as frequently to produce discharges of blood and mucus, with aggravation of all the symptoms.

Grievous, then, as are the errors of *omission*, noticed in the preceding article, where hepatic disease of the most dangerous nature actually exists, overlooked, and fruitful as these prove in calamity, they are not surpassed by the errors of *commission* in the instance just cited, where mercury, bloodletting and drastic purgatives are quite as injurious to health, as they are necessary to save life in the former condition: in fact, there is no description of error more common, or more injurious to public health than the two opposite ones here mentioned, or any against which the inexperienced require a greater safeguard.

J. R. M.

XXIII.—On Disorders that Simulate, and such as are indicative of Actual Disease in the Liver.

I may venture to assert, from pretty ample experience, that not one in ten of those who are supposed to labour under "chronic liver disease," as it is termed, on their return from hot climates, have any organic affection of that viscus, which can be detected by the most minute examination. It is really astonishing how many people are deceived—medical men as well as their patients, respecting enlargements and indurations of the organ in question. There are very few who labour under derangement of function in the liver or digestive apparatus, who have not *tenderness* on pressure, and an apparent *fulness* in the epigastric region, and under the false ribs of the right side. These symptoms alone are quite enough, in some men's minds, to entitle a tropical invalid, in particular, to the privilege of having "chronic hepatitis," with enlargement of the organ. Yet, in nine instances out of ten, there is no such thing as organic disease in the case.* The tenderness on pressure is infinitely more common where there can be no suspicion of *organic disease* of the liver, than where this last is palpable to the touch or even the eye. It is very common in the lighter shades, as well as in the higher degrees of dyspepsia, and arises from morbid sensibility in the nerves of the stomach and bowels, far more frequently than from change of structure, either in the liver or other contiguous organs. It is very often present, even where there is no *functional* affection of the above-mentioned viscera, but where there is an irritable state of the mucous membrane of the colon, as it sweeps round under the liver and false ribs; nay, I affirm that this tenderness of the epigastrium, to which so much undue importance is attached, may, at any time, be induced by a dose of purgative medicine that irritates the mucous membrane of the intestines. There is, in fact, at all times, and in all people, even in the highest health, a greater or

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* The Edinburgh Journal of Medical Science, while remarking on this passage of my work, adduces the following testimony in corroboration of my sentiments.

"Dr. Knox, our distinguished fellow-labourer, whose fame, as an anatomist, must be well known to our readers, has just given us a strong confirmation of this view of hepatitis (in which we heartily concur) so ably supported by Dr. Johnson. At Hilsea Barracks, whither the invalids from India, Ceylon, and the Indian islands, used formerly to be sent, he dissected from forty to sixty bodies, said to be labouring under simple hepatitis, or hepatic dysentery, and of this number two only exhibited traces of *organic* disease of the liver."—*Ed. Jour. Med. Science, No.* 5.

But, like the stomach, the liver is very frequently affected in its *function*, when the anatomist's knife can detect no change in its structure. This is to be constantly borne in mind.

less degree of tenderness on pressure at the pit of the stomach—most probably owing to the vicinity of the great semilunar ganglion, or solar plexus, the *sensorium* of the abdominal viscera. What school-boy does not know how easily he may be what is called "hearted" by a slight blow in that region? I repeat it, then, that tenderness, in epigastrio, is an exceedingly fallacious sign, and no criterion at all of organic disease in the parts underneath.

This natural tenderness at the pit of the stomach leads to another error very commonly committed—namely, the belief that an enlargement of the liver exists. The moment that the fingers of the physician or surgeon are thrust against the parietes of this region, the abdominal muscles are thrown into action, and one of the rigid bellies of the rectus, on the right side, is every day mistaken for the edge of the liver. Of this error I have seen numerous examples. No accurate judgment can be formed till the patient is placed in such a horizontal position as entirely relaxes the abdominal muscles. In some people, indeed, it is almost impossible to get these muscles relaxed in any position, while under examination; as they are voluntarily or involuntarily thrown into action the moment the fingers are applied to these parts. And, after this relaxation is obtained, a loaded state of the colon (no uncommon occurrence) will often deceive the incautious practitioner, and lead him to think he has discovered an indurated liver, which, in a few days, disappears under the use of aperient medicine!

In respect to fulness of the epigastrium there is much misconception. In corpulent people, no dependence can be placed on this symptom; while, in lean people, and especially in people who have become emaciated, as is often the case, the *fulness* is more *apparent* than real. In fact, in almost all people who are naturally thin, or emaciated by ill-health, there is an *apparent* fulness in the epigastrium while in the erect posture, produced by the shrunk state of the abdomen, and the descent of the liver at each inspiration. In some individuals, the stomach is much larger than in others, and any distention of this organ by food or flatus will give an unnatural appearance of fulness to this region.

Pain in the region of the liver, or, indeed, in the "right side," is another symptom which leads many astray. The biliary organ occupies a large space, and is surrounded by other organs and structures much more susceptible of pain than itself. The intercostal and other muscles, the stomach, the duodenum, and different contiguous parts, are far oftener the seat of pain than the liver itself—and even when the seat of pain is in the biliary apparatus, it is more frequently in the gall-bladder or ducts than in the substance of the organ. But *pain* is no proof of organic disease in any part of the body. The most painful disease to which the human fabric is subject, tic douloureux, is unaccompanied by any visible

change in the part, and often has its cause at a great distance from its apparent seat.

In respect to a symptom which has been, time immemorial, considered as pathognomonic of liver disease—*pain at the tip of the right shoulder*—I acknowledge that it does, in a certain proportion of cases, exist. But, from what I have myself seen, and from an examination of the records of cases where dissection proved the existence of organic disease in the liver, I am confident that this symptom does not accompany one-twentieth of the diseases in question; and that when it does obtain, it is far more frequently an accompaniment of disordered function than disease of structure. Neither is this pain so generally in the tip of the shoulder as is supposed. It is very often seated in the inferior angle of the scapula; nay, still lower down among the long muscles of the back. I have known it to continue long and troublesome, where the functions of the liver were but little affected, and where the case was evidently dyspepsia, dependent on irritability of the nerves of the stomach and upper bowels—and it has disappeared under the use of medicines directed entirely to the dyspepsia. Why this part should be more frequently the seat of this sympathetic pain than other parts of the body, is by no means accounted for by any particular distribution of nerves. True it is, that there is no spot on the surface of the body, the nerves of which do not communicate, directly or indirectly, with the nerves of all other parts; but this does not clearly account for the peculiar courses and directions in which sympathies run. Thus, tic douloureux, when dependent on irritation in the digestive organs, takes its seat very generally on one side of the face—for which no very satisfactory reason can be given.

Pain, then, whether in the region of the biliary apparatus, in the shoulder, or in the back, is no criterion of organic disease of the liver. It is more frequently absent than present in such disease—and, when present, it is more commonly dependent on *disordered function* of the liver or stomach, than on any change of structure in either of these organs that can be detected by the knife of the anatomist, on dissection.

This symptom, by the way, is rather a sense of burning or aching than actual pain. It is more felt when exercise is taken than when the individual is quiet—and is very generally, increased when the stomach is more than usually out of order, or when any temporary irritation of mind is kindled up.

These are some of the principal sources of fallacy in regard to organic diseases of the liver, and often lead to unnecessary courses of mercury and other medicines, that, at least, do no good, but sometimes much harm.

What evidence, then, it may be asked, have we of change of structure in the biliary apparatus? If this organ can be felt protruding below the

ribs, we can say, it is *enlarged*, but of what that enlargement consists, no pathologist can tell—unless he speak by guess. It may be tubercles —it may be interstitial deposits in the parenchymatous structure, of various kinds and consistencies—or hypertrophy of the parenchyma itself. It may be hydatids, &c. but the scalpel alone can unravel the true nature of the disease—and *then* it is little consolation to the owner of the organ, even should its portrait form a beautiful and expensive plate, or the diseased mass be preserved in that fluid which destroyed its original texture and life itself!

Of the various changes of structure which dissection has shewn in the livers of those who have sojourned in hot and unhealthy climates, an enlargement, generally with induration, of the parenchymatous structure of the organ, is perhaps the most common. Whether this increase of volume be owing to simple increase of the natural structure (hypertrophia or reproduction, as it is called by some foreign writers), or to an interstitial deposit of fatty, albuminous, or other animal material, admits of some doubt. That the liver, like the heart, may become magnified by multiplication, as it were, of its own natural substance, is by no means improbable; since we every day see livers of immense size, but of apparently healthy, or at least homogeneous structure, in the bodies of those who betrayed no symptoms of liver-disease during life. But in the great majority of those who have evinced derangement of function and increase of size in the biliary organ, we find a *variegated* appearance in the structure after death, proving an interstitial deposit, which I conceive to be the most common cause of the enlargement. To the other morbid growths, as tubercles, hydatids, &c. the tropical invalid is not more subject than his countrymen at home.

There is yet another organic disease of the liver, more common in this country than in hot climates; which consists of a diminution and condensation of the parenchymatous structure, with a corresponding inefficiency of function, and a long train of symptoms which it would be endless to enumerate.

The above are the principal changes which the biliary apparatus undergoes during life, and which can only be ascertained by the knife after death. But, it will be asked, "can we not tell by the symptoms what is the organic change going on?" I venture to assert that we cannot. Since little can be learnt from external examination, in respect to the *kind* of structural disease in the liver, we have only the disorder of function, and its consequences on the constitution, to guide us—and I unhesitatingly aver, that *disorder of function* in the biliary apparatus is often more considerable where there is no change of structure, than where there is organic disease of great and irremediable magnitude. This is so much the case, that when I find much functional disturbance in the biliary secretion, and much constitutional derangement resulting thence, I conclude (unless

there be *tangible* enlargement) that the structure of the liver is unaffected in any material degree.

The symptoms which afford the greatest probability of organic disease in the liver (supposing that no tangible enlargement is present, for then the case is unequivocal,) are wasting of the body, a peculiar sallow and unhealthy aspect of countenance, permanent yellowness of the skin, derangement of the stomach and bowels, and dropsical effusions. None of these symptoms are *certain* criteria, nor even the whole of them combined—they merely afford presumptive proof. They may all, even the permanent jaundice, exist, where the scalpel can detect no material change of structure.* The morbid condition of the bile, or, in other words, *disordered function* of the liver, is, as I observed before, much more conspicuous and severe in many cases where there is no change of structure, than in cases where the enlargement of the liver is unequivocal, and the whole organ full of tubercles or other morbid growths. This is hardly credible, but it is a fact. I have seen motions, day after day, and week after week, containing the most healthy-looking bile, where the liver reached as low as the umbilicus, and was found after death a mass of disease; while, on the other hand, every practitioner must have seen patients passing, for months in succession, or rather for years, the most depraved biliary secretion, deranging the functions of all the abdominal organs, and powerfully disturbing the health, where no organic disease could have existed, since all these symptoms have been found to vanish suddenly under the influence of proper medicine, diet, and pure air.

In fine, we have no certain mark of organic disease of the liver, but tangible enlargement of its substance, and *then*, no certainty of the precise nature of the morbid structure—all the disorders of its function, and the consequences of these disorders on the general health, being found infinitely more often *without* than *with* any cognizable change in the organization of the biliary apparatus.

This investigation or analysis of diagnostic symptoms, is of the utmost importance in a practical point of view, for it narrows the treatment into two principal indications—that which is designed for the reparation of diseased structure, and that which is directed to the correction of disordered function.†

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* Cases of permanent jaundice are on record, where no organic disease of the liver or obstruction of its ducts could be found after death. Such cases, however, are very rare; and permanent jaundice may generally be set down as dependent on some tumor in the liver pressing on the bile-ducts, and causing regurgitation, or absorption of the bile into the circulation.

† Inflammation, acute or chronic, and irritation, are rather to be considered the morbid processes by which structure is changed, and function disordered, than the organic

Treatment.—As I have already shewn that we have no certain proof of diseased structure in the liver, except from its tangible enlargement, so it is to this state that I confine myself on the present occasion; for this criterion being absent, all we can aim at is the improvement of *disordered function*, which has been fully treated of already.

Have we any, and what methods of removing enlargement of the liver, including various kinds of morbid growths? That simple enlargement of this organ is often removed by proper means, there can be no doubt; but that we have much power over tubercular or hydatid growths, is very questionable. In all kinds of enlargement, however, one great object is to cut off as much of the supply by which the morbid growth is fed, as possible—and the next is to promote the absoption of what has already taken place. There can be very little doubt that, in most morbid growths, both in the liver and elsewhere, there is more or less increased activity of the blood-vessels of the part—or, in other words, inflammation, generally of the chronic kind. This slow or chronic hepatitis, by which the biliary organ is ultimately changed in structure, with induration and enlargement, shews itself more by derangement of function in the organ itself, and in those organs with which it is associated in office, together with a number of anomalous symptoms in the constitution at large, than by those symptoms which are common to slow inflammation in other structures of the body. We must not expect to find quickness of pulse, heat of skin, thirst, and other inflammatory phenomena, attending this slow process of disorganization, though these are more easily excited by slight causes than where there is no local disease. The constitutional disturbance will be found to be more proportioned to the derangement of the biliary secretion than to the change of structure or increase of bulk in the organ itself. Every practitioner must have seen instances where the liver descended low in the abdomen with little apparent inconvenience to the constitution, while, in other cases, where the same organ could scarcely be felt, the great deterioration of its function has produced the utmost distress of mind and body, and led to dropsical effusions, fevers, and other diseases destructive of life. From this it will be evident that one great object in the treatment of structural disease of the liver, is to correct or improve its function; and, as an inflammatory irritation is at least a main cause both of the organic change that is going forward, and the disordered secretion that obtains, the removal of all agents that increase or keep up this irritation or inflammation is a *sine qua non* in

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and functional affections themselves. It would not be proper to say that a man labours under organic disease of the lungs because he is affected with pneumonia, though the pulmonic inflammation may terminate in or produce disorganization. And, on the same principle, I do not class hepatitis, acute or chronic, among the organic changes in the liver, though it leads to those changes.

the treatment. As my object in this Essay is rather to render the indications simple and clear, than to enter into minute details of therapeutical management, I need only observe that, in the organic disease of which we are treating, our main chance of success lies in dietetic discipline. If the patient will not consent to abandon the luxuries of the table, and the stimulation of wine, and all fermented liquors, his fate is cast, and bloated dropsy, with all its horrors, will soon overtake him.

Strict abstinence in respect to food, and a very moderate allowance of every kind of vinous and spirituous potation, act in a triply beneficial manner. This system diminishes the supply of nutriment to the morbid growth—withdraws stimulation from an already irritated or inflamed organ —and powerfully promotes the absorption of any interstitial deposit or other preternatural growth in the biliary apparatus. The result is an improvement in the function of the organ, and a general amelioration of the health, if at all within the reach of amelioration.

This is the fundamental principle of treatment in organic, as well as in functional disease. All the others are subordinate, but many of them very important. There are medicines which experience has proved to be capable of increasing the power of the absorbents in the removal of morbid growths. The principal one is mercury; but it must be very carefully managed in organic diseases. Mercurial frictions over the region of the liver should be preceded by several repetitions of a smaller or greater number of leeches, according to the exigency of the case, and the strength of the patient. After ten days or a fortnight, the leeches should be re-applied —then a crop of pustules brought out by tartarized antimony—and then again, the original measures renewed. A succession of changes, in this way, do a great deal more than a long-continued course of any one remedial process.* In the mean time, the secretions should be strictly attended to. Gentle bitter aperients, as rhubarb combined with extract of camomile or gentian and blue-pill, may be given, and even the sulphate of quinine, when the appetite and digestive powers are weak. These means will enable the patient to take in and digest a sufficient quantity of light and unirritating nutriment to sustain the constitution, while attempts are made to reduce the unnatural structure in the liver. In organic as well as functional disease of the biliary apparatus, there is generally great derangement in the functions of the skin and the kidneys. Colchicum and the

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* The propriety of a course of mercury, so as to affect the constitution, in tangible enlargements of the liver, must depend on the circumstances of the individual case; for it would be very dangerous to recommend it as a general rule, though nothing is more common than the association, in the mind, of an enlarged liver and a course of mercury. It is known, however, that mercury is often more beneficial in functional, than in structural diseases of this organ, but it must be used as an alterative rather than as a salivating agent.

taraxacum are very useful auxiliaries in such cases, while the greatest attention is to be paid to dress, and to avoiding night air and moisture. The saline aperient waters of Cheltenham or Leamington, with the combined advantage of country air and mental amusement, will much contribute to improve the function of the liver, and through that process, the structure. Too little attention is paid to the urinary secretion in hepatic diseases, though it is of the utmost importance, for dropsical effusions are the consequences which are most to be dreaded in all organic affections of the biliary apparatus, and they generally become the ultimate cause of the fatal termination. The taraxacum, in the form of expressed juice, or decoction of the root, with super-tartrate of potass and spices, is a very valuable medicine, as it improves the biliary secretion, and acts both on the bowels and kidneys. It may be used as a good substitute for mercury, or, at all events, to lessen the quantity that might otherwise be considered necessary, of that active mineral. How far iodine may possess the power of reducing morbid growths in the liver, has not yet been well ascertained; but it seems worthy of trial. In India, the actual cautery is much used by the native doctors, in enlargements both of the liver and spleen, especially of the latter—and often with benefit. Europeans do not like to submit to this *apparently*, but not really, formidable operation. The moxa might also be of some service.

These very brief observations are all that I deem it necessary to offer in respect to that organic disease of the liver which is ascertained by tangible enlargement. Without this criterion we have no positive proof of organic disease at all, and consequently our whole system of treatment hinges on regulating and improving the hepatic *function*, an indication which it is of infinite importance to pursue, and which would save many lives that are annually lost under the impression of organic disease, and under the system of treatment which is considered suitable to such a condition of the biliary apparatus. I have endeavoured to reduce the diagnosis within its proper, or, at all events, its practical limits, and to restrain the vague notions respecting "liver disease," which are so prevalent and so detrimental. Indeed, I am convinced that were the term and idea of "organic disease" of the liver obliterated, not only from the nosological chart, but from the minds of practitioners, it would be much better for their patients. No possible danger can accrue from mistaking an organic disease of the liver for a functional one—but much mischief may result from the contrary mistake. This will appear a strange position to be maintained, and is the reverse of that commonly laid down; but it is not stated without mature reflection. More diseases of *structure* in the liver would be cured by careful attention to its *function*, than by all the other means put together.

In quitting this subject it is hardly necessary for me to say, that acute inflammation of this organ is passed over as not properly coming within the common acceptation of structural or functional disease.

J. J.

XXIV.—Remarks on the Diseases of the Spleen in Bengal.

The diseases of the Spleen common to unhealthy countries have been variously described by medical writers; but hitherto the pathology, as well as the measures of cure, have not been satisfactorily made out; neither has the function of the organ principally involved been as yet explained by the investigations of the physiologist. With so much of the element of uncertainty, it is no matter of surprise that the subject has hitherto been approached by most medical writers, in doubt and hesitation—I shall therefore, in the following sketch, endeavour to confine myself to questions of a purely practical advantage.

That, in malarious countries, most of the splenic diseases have their origin in congestive and inflammatory states, induced by disturbed balance of circulation in the remittent and intermittent fevers of certain localities, there seems no reason to doubt; and a knowledge of this fact will naturally lead us to some acquaintance with measures both of prevention and cure.

The results of frequently recurring congestions, or of chronic inflammations of the spleen are;—hypertrophy—induration, with or without enlargement, and softening;—all these being observable in Bengal, chiefly throughout the cold season, and amongst the children of indigent European parents—British soldiers who have campaigned in unhealthy districts, and the natives.

The same states of disease are seen to follow the maglignant fevers of Western Africa, of Arracan, of Walcheren, of Italy, and other countries:—in short, we can have no hesitation as to the causes of the several forms of splenic disease, however deficient our information regarding their intimate pathology, and the best means of cure.

Two morbid states are described by Mr. Twining as common to Bengal; *viz.* the "*vascular engorgement*" and the "*indurated spleen,*" which, he says, "might be denominated hypertrophy." Thus far then, the definitions and phraseology would appear to be unsettled.

The vascular engorgement "depends, as it name implies, on inordinate accumulation of blood in the vessels and cells of the spleen," while the indurated spleen consists of "a more permanent enlargement, depending partly on accumulation of blood in the spleen, and partly on a change of structure in the interior of that organ, the result of internal subacute inflammation, whereby the parietes of the cells become thickened and indurated, and the contractile property of the spleen is diminished or destroyed. This modification of disease frequently follows the vascular engorgement." Thus then, we find the pathological state which constitutes the two diseases differing only in degree of advancement; and when Mr. Twining speaks of the "vascular engorgement which usually comes on suddenly in the course of fevers," we perceive but one of its most ordinary complica-

tions in unhealthy countries:—for instance, Dr. Robert Jackson found in the fevers of the West Indies, that the spleen was "generally distended, sometimes distended even to rupture." As to more permanent lesions, the fact I believe to be, that diseases of the spleen follow the course common to those of other organs; *viz.* first, congestion—secondly, inflammation, acute or chronic—and lastly, induration, with permanent loss of natural structure.

But, without attaching more importance to classification or definition than a desirable simplicity demands, I shall here offer a brief description of diseased spleen as it appears in Bengal, in its acute and chronic form, that appearing the more natural arrangement of the subject.

In the more acute form of the disease, we have present, some febrile action—a sense of dull pain in the left hypochondrium, extending to the shoulder of that side, accompanied by fulness and increased uneasiness on pressure—all indicative of something more than mere engorgement of the vessels:—in truth, we cannot here, any more than in similar states of the liver, say where congestion ends and inflammation begins;—fortunately also, the distinction is not of much practical importance, as the treatment which removes the one, will obviate the other. Why the worse term "engorgement" is preferred by Mr. Twining to the more truly expressive and old one of congestion, does not appear. Certain it is, that the altered form of expression has in no way added to or improved our knowledge of the obscure pathology of congestion, whether of the spleen or of other organs. In medicine especially, terms ought not to be changed, unless they express relations established as certain, which have not been determined before; whereas here, we have but a distinction in words, without any difference in fact. Whether this form of splenic enlargement be the result of fever, or of the gradual influence of malaria, it is important, owing to the very unfavourable state of the constitution which almost invariably accompanies it. As a complication of fever also, it is unfavourable in itself, and as putting an instant bar to the use of mercury, however desirable the use of that mineral may prove as a means of equalizing the circulation, eliciting secretion, or relieving local congestions, in other organs. To a practised eye, the very countenance of the sufferer bespeaks his condition. The complexion is of a dirty lemon colour, the integument being puffed and bloated; the eye pale and of a peculiar clearness; the lips and tongue blanched and bloodless; in short, we have here a concentration of the cachexia of systematic writers. A wound or trifling abrasion, which at another time would escape notice, here becomes a foul and sloughing ulcer, owing to the depraved state of the blood, and the generally diseased state of the system. Hæmorrhages arise from slight causes; and, so altered is the character of the blood, apparently from want of red globules, that, when performing surgical operations of immediate necessity at the Native

Hospital, I always became aware of the existence of splenic disease on making my first incision.

In addition to the depravation of the fluids, we have excessive muscular debility, bodily inertness, and mental despondency; the whole morbid assemblage tending to obstruct the functions of respiration and circulation, and to interfere seriously with the process of assimilation. It is no matter of surprise, then, that fatal terminations, when they occur, should be preceded by dropsy, hæmorrhages, or gangrenous ulcers of the cheeks and gums, to which latter, persons suffering from splenic disease are peculiarly liable.

The appearances on dissection vary from the firm and friable condition, to the indurated and banded texture, approaching to scirrhus. In the softened spleen again, we find its substance reduced to the condition of a grumous mass, indicating a diseased state of the constituents of the blood. Thickening of the investment, and adhesions of it to that of the surrounding parts are more commonly found in the native than in the European subject.

In cases of recent occurrence, where the state of the system exhibits an inflammatory action, or one of acute congestion, whether in the abdominal vessels generally, or confined to those of the spleen, a moderate bloodletting, general and local, will be had recourse to with advantage; but where we see the patient in an ill state of health, or recovering from severe fever, the application of leeches, repeated according to occasion, will be generally sufficient, followed by a course of brisk purging and sudorifics. The cure is then completed by the daily use of Dr. Shoolbred's spleen powder, in use for the last forty years in Bengal, or the same in the form of solution, as recommended by Mr. Twining. The formulæ for each is given below:—

Dr. Shoolbred's powder:—

℞. Pulv. Jalapæ
—— Rhei
—— Scammoniæ
—— Calumbæ
Potassæ Supertart. āā ʒj.
Ferri Sulphatis ʒss.
Ft. pulvis. M.

Mr. Twining's modified formula:—

℞. Pulv. Jalapæ
—— Calumbæ
—— Rhei
—— Zingiberis
Potassæ Supertart. āā ʒj.
Ferri Sulphatis ℈ss.
Tinct. Sennæ ʒiv.
Aq. Menth. Sativæ ʒx.
M.

Of Dr. Shoolbred's powder a sufficiency is given to move the bowels three or four times daily. It has long been a favourite remedy in Bengal. Mr. Twining gives of the liquid formula, to an adult, one ounce twice a day, and to children, a sufficiency to procure three motions daily. During

an interval in the use of the mixture, Mr. Twining recommends the union of iron and purgative extracts over night, followed in the morning by powder of myrobolau, and black salt of the bazaar.

It is almost unnecessary to urge the necessity of attention to the diet, so long as any heat of the skin or general febrile condition exists, or to repeat that here, as in other tropical diseases, convalescence can only be secured by such care, in aid of medicine.

When the more acute local symptoms have subsided, and the disease has become a simple chronic enlargement, we still find but slight corresponding improvement in the health; and, in general, according to the duration of the disease, and the size of the spleen, so do we find the cachectic state to prevail. Again, we see cases of long standing, with enormous spleens, occupying two-thirds of the abdominal cavity, yet with no other apparent disturbance of health than sense of weight in the left hypochondrium; while, in other cases, and with varying degree, we have all the unfavourable disorders of the system already described as concomitants of the more acute splenic disease.

In the chronic state, measures of general depletion are seldom had recourse to, and even those of a local nature can only be sparingly used. The general practice in Bengal is a steady course of the tonic aperient of Shoolbred, already mentioned, sometimes adding quinine, with stimulant and rubefacient applications to the region of the spleen.

Having found, however, that where mucous intestinal irritation was present, attended by a hectic form of fever, the spleen medicines in common use were altogether inadmissible, as occasioning increase of irritation, or dangerous diarrhœa, I had recourse to other, and, I think, more effective remedies. In these cases, and they are of frequent occurrence, after subduing intestinal irritation, I had recourse to the tinctures of iodine and of muriate of iron, in the following proportions, and found the plan very often successful at the Native Hospital. Frictions with croton oil were repeated over the region of the spleen at the same time.

℞. Tinct. Ferri Muriatis
—— Iodine, āā ʒss.
Aq. Distillat. ʒj. Misce.

Of this, ten minims were given thrice a day, and gradually increased. But when the tinctures disagreed, I exhibited Iodide of lead, with even more rapid success. The following was the formula used:—

℞. Plumbi Iodidi, ʒss.
Confect. Rosæ, q. s.
Divide in pilulas cxliv.

Of these pills, one was given night and morning, increasing the number gradually.

With this remedy alone I cured the largest spleen I ever saw in Bengal; and, as the case is interesting, I shall beg leave to mention the leading particulars.

While reduced by an eruptive fever, a young European was seized with ague, for the cure of which he had no treatment; the consequence was, an enormous enlargement of the spleen, for which the Iodide of lead, and nothing else, was exhibited. The treatment was frequently interrupted too by attacks of catarrhal fever; but in four months the spleen was not to be felt and the general health had greatly improved.

It was observed that during the whole of this time no aperient was required, the bowels acting on an average thrice daily. In this case the enlargement was of very sudden growth, a fact in the pathology of spleen observed in many countries as well as in Bengal; but, when I first saw the patient, the disease had been of many months' standing.

In the chronic form of the disease a better diet is admissible, but it must still be light and easy of digestion—not stimulating.

My experience of the effects of the nitro-muriatic acid bath in spleen disease is limited; but I would beg to call attention to what has been said at page 283 on that head. This remedy appears to have been used successfully by Mr. Annesley of Madras, and is therefore deserving of trial in the sister presidency, as recommended by an experienced and impartial observer.

We cannot say the same of mercury used even in a restricted or preliminary manner; for it has always been found unsafe in the splenic diseases of Bengal. That there may, however, be differences in the seat of disease, and in the attendant condition of the system, owing to differences in climate and local influences, so as to admit of some modification of this strict rule of prohibition, it were hard to deny, when we see an officer of Mr. Annesley's well-earned reputation assert the contrary, on the ground of his extended experience in the South of India.

At all events a just consideration of what is due to these circumstances, and to the character so long held by Mr. Annesley in Madras, ought to have prevented the late Mr. Twining from indulging in criticisms which have had no other effect than laying his own memory open to a charge of unfairness.

Nothing is so easy in medicine as to find fault.

The French practitioners recommend large doses of quinine, exhibiting the salt to the extent of from forty to eighty grains in the 24 hours, the quantity being in direct ratio to the extent of the enlargement.

Dr. Elliotson, in his clinical lectures, inculcates a nearly similar plan.

Where the stomach will not bear the larger doses, the continental physicians administer it in the form of enemata, to be carefully retained.

In the sketch here given of the more ordinary diseases of the spleen in Bengal, I have purposely avoided lengthened description; for, so long as

the intimate nature of these morbid states remains doubtful, and the treatment unsettled, such disquisition can prove of but questionable utility. When loss of health obliged me to quit India, I was engaged in inquiries relating to these subjects which I thought might prove of practical avail; but, to my brethren there, the questions may well be committed: they have opportunities ample as their talents. They must remember, too, that "some of the greatest improvements in medicine have resulted from researches made in hot climates—and there is not a single fact observed, or a single disease investigated on the banks of the Ganges or the Mississippi, that does not bring its quota of utility to the practice of medicine in our own country."

In the following Comparative Table, I have not been able to include the three Presidencies of India—a want the more to be regretted, as the extension of the comparison would have proved both interesting and important. The Table is from the same authentic quarter as the others.

STATIONS.	Period of Observation (inclusively.)	Aggregate. Strength.	Number admitted into Hospital.	Number Died.	Proportion of deaths to admissions.
Windward and Leeward Command	1817—36	86661	104	3	1 in 34⅔
Jamaica	1817—36	51567	59	..	0 in 59
Bahamas	1817—36	535	5	..	0 in 5
Honduras	1822—36	320	—	—	—
United Kingdom (Dragoon Gds & Dragoons)	1830—36	44611	5	..	0 in 5
Gibraltar	1818—36	60269	21	..	0 in 5
Malta	1817—36	40826	21	..	1 in 10½
Ionian Islands	1817—36	70293	133	4	1 in 33¼
Bermudas	1817—36	11721	2	..	0 in 2
Nova Scotia and New Brunswick	1817—36	46442	19	..	0 in 19
Canadas	1817—36	64280	25	..	0 in 25
Western Africa	1819—36	1843	166	7	1 in 23¾
St. Helena	1818—21, 1836—37 (6 yrs.)	5908	1	..	0 in 1
Cape of Good Hope (Cape District)	1818—36	22714	49	..	0 in 49
Cape of Good Hope (Eastern Frontier)	1822—34	6630	5	..	0 in 5
Mauritius	1818—36	30515	17	..	0 in 17
Ceylon	1817—36	42978	50	..	0 in 50

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XXV.—Sketch of the earlier Indian History of Epidemic Cholera.

The first notice of this disease we have, by an European writer, is that of Bontius, physician to the Dutch East India Company, and who wrote in 1629, in Batavia. "The cholera morbus," he says, "is extremely frequent: in the cholera, hot bilious matter irritating the stomach and intestines, is incessantly and copiously discharged by the mouth and anus. It is a disorder of the most acute kind, and therefore requires immediate application." In its severer form "the animal spirits" are described as speedily "*exhausted, and the heart, the fountain of heat and life, is overwhelmed with putrid effluvia; those who are seized with this disorder generally die, and that so quickly, as in the space of four-and-twenty hours at most. This disease is attended with a weak pulse, difficult respiration, and coldness of the extreme parts; to which are joined great internal heat, insatiable thirst, perpetual watching, and restless and incessant tossing of the body. If, together with these symptoms, a cold and fetid sweat should break forth, it is certain that death is at hand.*" Bontius treats of the "cholera morbus" and "spasm" as separate diseases; yet it is presumed that both were frequently united, and that, in reality, the spasm was a common complication with cholera, as indeed he describes it in the case of Cornelius Van Royen, who "was suddenly seized with the cholera, about six in the evening, and expired in terrible agony and convulsions before twelve o'clock at night."

I shall now lay before the reader, in as condensed a form as possible, the results of inquiry instituted by order of the Government and medical authorities of Bengal, Madras, and Bombay, with a view to obtain the best possible information as to the history, nature and cure, of epidemic cholera.

How ably the medical services of the three presidencies responded to this call, need not now be pointed out; neither is it necessary to dwell on the original merits of the author of the "Essay on the Influence of Tropical Climates on European Constitutions," further than by stating, on the authority of Dr. Copland, that "the nature and treatment of the disease were very imperfectly known, until Dr. James Johnson described its symptoms, and pointed out a more successful method of cure, than had previously been employed."—*Dictionary of Practical Medicine.*

In the reports of the medical boards of Bengal, Madras and Bombay, we find the following notices:—

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1781. In March of this year a

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1774. The "true cholera mor-

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disease, in all respects resembling the recent epidemic cholera, seized on the Bengal force under Colonel Pearse of the Artillery, while marching through the Northern Circars to join Sir Eyre Coote's army. Seven hundred men died within the first few days, and three hundred convalescents were left behind; this out of an original force of five thousand men.

"Men in perfect health dropt down by dozens: and those even less severely affected were generally dead, or past recovery, within less than an hour. Spasms of the extremities and trunk were dreadful; and distressing vomiting and purging were present in all."

1783. Cholera is said to have broken out at the sacred bathing spot of Hurdwar, on the Ganges, in April of this year.

It happened to be one of the twelfth years deemed peculiarly propitious by the Hindus, and the assemblage of pilgrims was consequently far beyond the common annual average, amounting it is said, this year, to nearly two millions.

"The disease broke out on the springing up of an easterly land-

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bus" is described by Dr. Paisley, of Madras, as being "often epidemic" amongst the natives, whom it destroyed quickly. In the first campaigns, it proved very fatal to both the European and native troops. He describes it as "operating on the system as a poison, and brings on a sudden prostration of strength, and spasm over the whole surface of the body." The pulse he found to "sink suddenly, and bring on immediate danger."

Sonnerat speaks of "an epidemic disorder which reigns" on the Coromandel coast, and his observations embrace the period from 1774 to 1781.

After describing the symptoms, and that the poorer and more negligent classes are most obnoxious to its seizure, he states that, "above sixty thousand people from Cherigan to Pondicherry perished." "The Indian physicians," he says, "could not save a single person."

One epidemic is described as peculiarly severe. "Those who were attacked had thirty evacuations in five or six hours, which reduced them to such a state of weakness that they could neither speak nor move.

They were often without pulse; the hands and ears were cold; the face lengthened; the sinking of the cavity of the socket of the eye was the sign of death; they felt neither pain in the stomach, cholics, nor gripings. The greatest pain was a burning thirst."

1787. A disease is reported as prevalent this year at Arcot, "si-

BENGAL REPORT.

wind during the night, and carried off innumerable persons." In less than eight days, twenty thousand victims are said to have fallen; yet so confined was its influence, that it did not extend beyond the place of bathing, and ceased on the dispersion of the multitude.

1790. In the middle of April of this year, a fatal cholera of the spasmodic form attacked the detachment under Colonel Cockerell, marching from Bengal to Seringapatam, in the same country in which it had previously proved so fatal to the force under Colonel Pearse—the Northern Circars.

The above three notices, two of which refer to seizures beyond the bounds of the Bengal Presidency, are all of which any record could be obtained by the talented author of the Calcutta Report. Rumour, indeed, had spoken of severe cholera in Bundlekund some forty years previously to the date of Mr. Jameson's report, or about the year 1780, and of another some time near the end of the last century; but as no authentic history existed respecting their nature, no attempt is made to trace them.

The Bombay Report enters into no history of epidemic cholera, beyond a casual reference to a letter from Dr. Taylor, who gives an account of a disease, taken from a Sanscrit work, "which leaves very little doubt that it has not only been long known to the natives, but proves its identity."

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milar to an epidemic that raged amongst the natives about Palicola, and in the army of observation in January of 1783, in the Bengal detachment at Ganjam in 1781, and several other places at different times.

The characteristic marks were, spasms of the præcordia, and sudden prostration of strength.

The treatment consisted of stimulants and hot baths, supporting the vis-vitæ."

1782—90. During this period cholera, under various names, but always with the same symptoms and results, would seem to have prevailed in various parts of India.

"The mort de chien, or cramp," prevailed in Sir Ed. Hughes's fleet in 1782. The sufferers were "*soon brought to great weakness, coldness of the extremities, and a remarkable paleness, sinking and lividity of the whole countenance.*" There was "*great thirst, or rather a strong desire for cold drinks, but there was no headache or affection of the sensorium commune throughout.*"

From July to September 1782, Mr. Curtis describes the same disease in the Madras Hospital, and in the fleet.

1782. Mr. Girdlestone describes a disease exactly similar, as destructive to the newly-arrived troops from

BENGAL REPORT.

MADRAS REPORT.

England, more than 50 of whom were carried off by it "within the first three days after they were landed."

1787. Dr. Duffins gives details of the symptoms and treatment of "cholera morbus," which then prevailed at Vellore with great violence —a disease "so rapid in its progress, that many of the men are carried off in twelve hours illness."

The same epidemic prevailed fatally at Arcot, to which station Mr. Davis, member of the Hospital board, was deputed to investigate its nature. "*He understood from the Regimental Surgeons that the last disease had proved fatal to all who had been attacked by it.*"

Mr. Thompson gives a similar account to that of Mr. Davis's, both having remarked on the singular contraction and emptiness of the bladder on dissection, it being found no larger than "a walnut."

1814. Two notices of cholera are found in this year—one by Mr. Wyllie of the 24th Regt., and the other by Mr. Cruickshanks of the 9th Regt., in which it appeared with great severity.

"The disease in the 9th Regt., in 1814, resembled in every particular, with exception to the heat at the præcordia, the cholera at present" (1819) "so common, although it could not be called epidemic." It appears to have broke out in a brigade of N. I. while on the march from Jaulnah about the 10th of June. The patients "*exhibited all the symptoms now so well known of persons labouring under the advanced*

BENGAL REPORT.

MADRAS REPORT.

and fatal stage of the epidemic cholera, the skin cold, and covered with a cold perspiration, the extremities shrivelled, cold and damp, the eyes sunk, fixed and glassy, and the pulse not to be felt. These persons all died, and I find, on referring to such notes as I have preserved, that, influenced by consideration of the vascular collapse, and total absence of arterial pulsation, I had denominated the disease, asphyxia."

The report of Mr. Cruickshanks is peculiarly valuable on many grounds, as well as for an early notice of one of those singular and unaccountable features which it has frequently manifested since, namely, that of the two corps composing the brigade, apparently under similar circumstances, one only was attacked, while the other escaped altogether.

Two distant and separate notices of the epidemic cholera, one 25 years, and the other 34, previously to 1817, are given by Mr. Staff-surgeon Hay. These visitations were in the Travancore country.

Dr. Burke, also, in a report from the Mauritius in 1819, where he was chief of the medical staff, states that a disease in all respects similar to the recent epidemic is reported to have occurred in that island in the year 1775. "*The symptoms, fatal and sudden effects, and duration of the disease would seem to be the same.*"

It thus appears clearly, that epidemic cholera prevailed at various remote periods, and at many of the principal stations throughout British India, sometimes coming as a wide-spread pestilence, and at others, desolating only particular localities.

That the disease, in its epidemic form, was not altogether unknown to our forefathers in Europe, is rendered more than probable also, by the

writings of various of the older physicians; and many of the cases described by Sydenham, in 1669, would seem to have been of the true spasmodic nature; but, as none of the visitations described by former writers approached in duration, extent, or severity that which took its rise on the banks of the Ganges in 1817, no detailed record of them is preserved.

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XXVI.—Cholera Morbus, Mort de Chien, and Spasmodic Cholera of India.

In no disease has a *symptom* passed for a *cause*, with more currency and less doubt, than in cholera. From Hippocrates to Celsus, and from Celsus to Saunders, *bile* has been condemned, without hearing, as the original perpetrator of all the mischief. "Bilis sursum ac deorsum effusiones," says the first; "Bilis supra, infraque erumpit," says the second; and, "Cholera Morbus," says the last of these authors, "may very properly be considered under the head of those diseases which *depend* on the *increased secretion* of bile."—*On the Liver, p.* 179. Yet I venture to affirm, that cholera does *not* "depend" on an increase, but on a diminution, and, in many cases, a total suppression of the biliary secretion.

A very excellent description of the disease in question, as it appears in this country, will be found under its proper head, in Rees's new Cyclopædia, written, I believe, by Dr. Bateman, and taken principally from Sydenham. I shall extract the following passage for my text: "The attack of this complaint is generally sudden. The bowels are seized with griping pains, and the stools, which are at first *thin and watery*, as in common diarrhœa, are passed frequently. The stomach is seized with sickness, discharges its contents, and rejects what is swallowed. In the *course of a few hours*, the matter vomited, as well as that which is discharged by stool, appears to be *pure bile*, and passes off both ways, in considerable quantities. The griping pains of the intestines now become more severe, in consequence of the extraordinary irritation of the passing bile, which excites them to partial and irregular spasmodic contractions. These spasms are often communicated to the abdominal muscles, and to the muscles of the lower extremities. The stomach is also affected with considerable pain, and a sense of great heat, in consequence of the same irritation. There is usually great thirst, and sometimes a severe headache, from the sympathy of the head with the stomach. The pulse becomes *small and frequent*, and the heat of the skin is increased. A great degree of debility, languor, and faintness, amounting even to syncope, speedily comes on; sometimes attended with colliquative sweats, coldness of the extremities, 'and such like symptoms,' says Sydenham, 'as frighten the bye-standers, and kill the patient in twenty-four hours.'"

Now, it does appear somewhat curious to me, that if an increased secretion of bile were the *cause* of the disease, we should see nothing of it till—"a few hours" after the *effects* become obvious! Where is the increased secretion all the time? Not in the stomach, for it "discharges its contents, and rejects what is swallowed" long before. It is not in the intestines, for the stools are at first "thin and watery." At length, however,

"*pure bile*" makes its appearance; and, lo! it is accused of being the *cause* of all!

At what season does this commonly take place? In August and September. Certainly that is the time for great heat and increased action in the hepatic system. But are there no particular attendant circumstances? Yes, says the author of the foregoing passage. "It has been remarked, that both in hot climates, and in the hot seasons of mild climates, *occasional falls of rain* have been particularly *followed* by an epidemic cholera."—*ib.* Indeed! a fall of rain is wonderfully well adapted to *increase* the secretion of bile! But, again: "In some places it is probable, that the heat of the season may give only a *predisposition*, and that certain *ingesta*, *sudden changes of temperature*, or other causes, in this state readily excite the disease."—*ib.* All these are admirably adapted, no doubt, to produce a great flow of bile! But let us return to Dr. Saunders, who has already informed us, that cholera "depends on the increased secretion of bile." He says, "it frequently takes place spontaneously, and independently of any *sensible* occasional cause. At other times, it is *evidently* connected with a sudden *change of temperature* in the atmosphere, during those months (August and September), or brought on by drinking *cold* liquors, or by any thing else that *suddenly chills the body*, especially when *overheated* by exercise or labour."—*p.* 181. Now, in what manner we are to connect these "evident" causes with an "increased secretion of bile," Dr. Saunders leaves us to find out as we can, for he has not even attempted an explanation. But, in truth, to set about proving that *cold* increased the hepatic action, would have been inconsistent, after what he previously advanced respecting the operation of *heat* on the biliary system.

Having shewn, I think satisfactorily, the inadequacy of these doctrines to an elucidation of the phenomena, I shall proceed to prove, that an "increased secretion of bile," so far from being the *cause* of Cholera Morbus, is, upon the whole, *a favourable symptom;* and that, in the very worst forms of the disease, it is *entirely absent*.

In no part of the globe does this terrific disorder assume a more concentrated state than on the coasts of Ceylon, especially its eastern side. The moutains tower to a great height, in fantastic shapes, or conical peaks, clothed from base to summit with almost impenetrable forests of lofty trees, underwood, and jungle. Deep vallies and ravines, still more thickly covered with similar materials, and choked up, as it were, with all the wild exuberance of tropical vegetation, separate the mountains from each other, and swarm with myriads of animals and reptiles. From these vallies, in the months of May, June, and July, when the S. W. monsoon is in force, the gusts of land-wind come down, hot and sultry by day, but chilling, cold, and damp by night. Where mountainous and woody, or flat, marshy, and jungly tracts, border on the sea, atmospherical vicis-

situdes will, *cæteris paribus*, be greater than where the coast is flat and gravelly, or dry and cultivated. The reason is obvious. Thus, the vicinity of Madras, for instance, being a sandy or gravelly soil, which, during the intense heat of the day, acquires a temperature, perhaps 60 or 70 degrees above that of the contiguous ocean, a considerable share of the night elapses before the heat of the earth sinks to an equilibrium with that of the water; and consequently, we seldom have the land-wind cold there, except after falls of rain; and, on the contrary, in May and June, it is hot throughout the night. At Ceylon, on the other hand, the surface of the ground being so defended from the sun's rays by woods and jungles, it never acquires any thing like the temperature of the opposite Coromandel coast; and, although during the months alluded to, when the south-west monsoon passes with great strength over Ceylon, the wind by day be hot and sultry, as soon as the dews have fallen in the evening, and evaporation commences from a very extended surface, the land-breeze is instantly rendered cold and raw; and being then loaded with vapour, together with all kinds of terrestrial and vegetable exhalations, communicates to our feelings and frames a chill, far exceeding what the thermometer would actually indicate. The same remark applies to Bombay; but in Bengal there are no regular sea and land breezes; consequently the changes of temperature are not so abrupt and extensive as in the before-mentioned places.

Numerous cases, exhibiting the dire effects of these atmospherical vicissitudes, aggravated, no doubt, by the land-wind effluvia, now lie before me —effects, indeed, that might well "frighten the bye-standers," or even Sydenham himself; for the patient is often cut off in a much shorter space of time than "twenty-four hours!"

A seaman on board a ship, lying in Back-Bay, Trincomallee, in the month of June, went to bed rather intoxicated. About midnight, however, he turned out, in a state of perspiration, and got upon deck, as is very usual, where he lay down in the cold land-wind and fell fast asleep. During the preceding day, the land-wind had been hot and sultry, the thermometer ranging from 86 to 88 degrees. In the night, the mercury fell to 74°, with raw, damp gusts from the shore. About four o'clock in the morning, he awoke with a shiver, and left the deck; but was soon seized with frequent purging and griping, his stools consisting of mucus and slime. Nausea and retching succeeded: nothing being ejected but phlegm and the contents of the stomach. His pulse was now small, quick, and contracted—his skin dry, but not hot. About eight o'clock in the morning, he began to feel spasms in different parts of his body, which soon attacked the abdominal muscles, and threw him into great pain. During these paroxysms, a cold clammy sweat, would be occasionally forced out, especially on the face and breast. The extremities now became cold, his features shrunk—the stomach rejecting every thing that

was offered, either as medicine or drink. The abdomen and epigastrium, all this time, were distended and tense, with incessant watery purging and painful tenesmus. By ten o'clock, his pulse could scarcely be felt—his breathing was oppressed and laborious—his eyes sunk, and the whole countenance singularly expressive of internal agony and distress! The extremities were cold, shrivelled, and covered with clammy sweats. The violence of the spasms now began to relax; and by eleven o'clock, or seven hours from the attack, death released him from his sufferings! The warm bath, opium, æther, and various medicines had been tried, without affording any relief.

This may serve as a specimen of the worst form of that dreadful disease, which has obtained the appellation of—"*Mort de Chien*," or Spasmodic Cholera. No bilious accumulations are to be seen, either in the stools, or what is ejected by vomiting, from the beginning to the end of the disease. Neither is there ever the slightest appearance of "*natural and healthy perspiration*." A watery fluid is occasionally forced out by the spasms and pain, while the skin is shrivelled and tense, and the subcutaneous or perspiratory vessels perfectly torpid.

From such an awful state of concentration, the disease assumes all degrees of violence, down to a common cholera. In exact proportion as bile appears, and the nearer it approaches to a natural quality, so much the less is the danger.

A seaman, from like imprudent exposure to the cold land-winds, after great fatigue during the heat of the preceding day, was attacked with symptoms nearly similar to the former. After the spasms came on, however, he had cold and hot fits alternately, with corresponding sweats, and bile appeared occasionally, both by vomit and stool. He had swallowed a scruple of calomel, and, in this case, blood was taken from the arm, which instantly alleviated the spasms. In an hour after the calomel was taken, a purgative enema brought off several copious alvine evacuations, followed by large quantities of bile, some of which was highly fetid and depraved. He now felt greatly relieved—fell into a free perspiration and sleep, and by the next day was perfectly well.

I could here adduce numerous cases, both favourable and fatal, and little differing, in essential symptoms, from the two related above. But as the point which I have pledged myself to prove, must be decided by unequivocal and disinterested evidence, I shall bring forward the testimony of Mr. Curtis, a most faithful and candid reciter of facts, as every page in his volume evinces.

It is necessary to recollect, that the disease which Mr. Curtis describes, and the place where it happened (Trincomallee), are those alluded to in Dr. Paisley's letter, where the latter affirms, and I think with justice, that *Mort de Chien* is nothing more than the highest degree of cholera morbus.

" Early in the morning of the 21st June," says Mr. Curtis, " we had two men seized with the *Mort de Chien*, both of whom we lost in a few hours; and in the course of the two following days, three more in the same complaint, without meeting with one fortunate case. To the 25th, when we sailed for Negapatam, we had three new cases of the same kind, all of whom were saved, but two of them with great difficulty. Besides these, we had several others, which were of a nature considerably different; *being evidently combined with bilious colluvies in the first passages*, a circumstance *not at all discoverable* in the five cases that ended fatally. All these (viz. where bile appeared) were found to be much more tractable—easily removed, and attended with little danger."—*p.* 48. " In all of them (the eight cases alluded to) the disease began with a *watery purging*, attended with some tenesmus, but little or no griping. This *always* came on some time in the night, or early towards morning, and continued some time before any spasms were felt." * * * " This purging soon brought on great weakness, coldness of the extremities, and a remarkable paleness, sinking, and lividness of the whole countenance. Some at this period had nausea, and retching to vomit, but brought up *nothing bilious*. In a short time, the spasms began to affect the muscles of the thighs, abdomen, and thorax; and lastly, they passed to those of the arms, hands, and fingers." —*p.* 49. " The patients complained much of the pain of these cramps. ——As the disease proceeded, the countenance became more pale, wan and dejected. The eyes became sunk.——The pulse became more feeble, and sometimes sank as much as not to be felt at the wrist."—*p.* 50. " The tongue was generally white, and more or less furred towards the root, with thirst, and desire for cold drink." * * * " The coldness of the extremities, which was perceptible from the first, continued to increase, and spread over the whole body, but with *no moisture on the skin*, till the severity of the pain and spasms *forced out* a clammy sweat, which soon became profuse."—*p.* 51. " All this time, the purging continued frequent, and exhibited nothing but a *thin, watery matter, or mucus*. In many, the stomach became at last so irritable, that nothing could be got to rest upon it, every thing that was drunk was spouted up immediately. The countenance and extremities became livid—the pulsations of the heart more quick and feeble—the breathing laborious. In fine, the whole powers of life fell under such a great and speedy collapse, as to be soon beyond the reach of recovery. In this progression, the patient remained from three to five or six hours, from the accession of the spasms, seldom longer."—*p.* 52. " In the Sea-horse, it attacked some remarkably robust, powerful, and muscular men, who had been in *perfect health immediately before*. Neither in all our class of *bad and fatal cases*, did there appear any marks of *bilious* colluvies, either in the colour of the *ejected matter*—the state of the abdomen, or the appearance of the tongue, eyes, and urine."—*p.* 56. * * * * * " We had, indeed, another set of

cases, where the presence of this (bile) was distinguishable by *all these characters*, but *these* were of a far *slighter* nature, and *none* of them turned out any way untractable or fatal." And again, at Madras, Mr. Curtis observes—" Out of about twenty under my care, a *third* were evidently connected with *bilious* colluvies; and in *these* there was no great sinking of the pulse, or diminution of the heat, and the spasms were confined to the legs and feet."—*p.* 69. These all recovered. Lastly, in two cases of dissection which took place immediately after death in this disease, Mr. Curtis affirms that—" there were no *bilious accumulations* found any where, and the internal organs were all in a sound state; only there was more water than natural in the pericardium, and the vessels of the lungs, liver, and mesentery, appeared to be very *turgid and full of blood.*"—*p.* 72.

I appeal to every unbiassed mind—nay, to prejudice itself, whether I have not now proved (I had almost said to a demonstration) the truth of that heterodox position with which I set out—namely, that " an *increased secretion of bile*," so far from being the *cause* of cholera morbus, is, upon the whole, a *favourable symptom;* and that in the very worst cases of the disease (mort de chien, for instance,) it is *entirely absent*.

This point being settled, the application of that principle, to which I have so often adverted—*the connexion* or *sympathy between the functions of the skin and liver*, will afford a more rational explanation of the phenomena, than either " an increased secretion," or a lurking, putrid accumulation of that far-famed mischief-maker—Bile.

The sudden and powerful check to perspiration—the unparalleled atony of the extreme vessels, debilitated by previous excess of action, and now struck utterly torpid, by the cold, raw, damp, nocturnal land-winds, loaded with vegeto-aqueous vapour, and abounding with terrestrial and jungly exhalations—break at once, and with violence, the balance of the circulation. The extreme vessels of the hepatic system, sympathising with those on the surface, completely arrest the reflux of blood from the portal, cœliac, and mesenteric circles; hence, in the worst cases, a *total* suppression of biliary secretion, with distention of the abdomen, and shrinking of all external parts. If this continue any time, as in *mort de chien*, death must be the inevitable consequence, notwithstanding the unavailing efforts which Nature makes, by vomiting, to determine to the surface—restore the equilibrium of the blood and of excitability, and, with them, the functions of perspiration and biliary secretion. In proportion, then, as the two latter appear, will the danger be lessened—our most salutary objects attained, and the disease become " less untractable and fatal."

The deluges of bile which occasionally burst forth on the *recommencement* of secretion in cholera, are the natural *consequences* of the great plethora in the portal and other abdominal circles of vessels, which took place during the previous check to biliary secretion, and free passage of blood through

the liver. And thus we see, that the very *last* link in the chain of *effects*, and that, too, a *salutary* one, has, for ages, been set down as the *cause* of cholera—" increased secretion of bile ! !"

With respect to the spasms, as they are totally unaccounted for by my predecessors, neither am I bound to dive into the mysteries of the nervous system, for a solution of the phenomenon. I think I have pretty clearly proved, that they are not attributable to bile ; since, in the most dangerous and fatal cases, no bile is to be found. I can easily conceive that the brain must suffer from the broken balance of circulation, as well as from its known sympathies with the stomach and liver, and thus, in some measure, account for the unequal distribution of nervous energy, which may excite cramps, and throw various classes of muscles into convulsive agitations. I am the more disposed to this opinion, from the circumstances, that in three desperate cases of *mort de chien*, the spasms were instantaneously relieved by venesection. In one of them which happened on board the Centurion, *trismus* (an unusual symptom) had taken place—the eyes were fixed, and the pupils dilated. Bleeding was attended with immediate good effects, and the patient was well next day.

Having mentioned trismus, I may here remark, that *mort de chien* must not be confounded with that or tetanus. For although the latter have arisen from checked perspiration in many instances, they are totally different from the disease under consideration. The gastric irritability, and dysenteric purging, might be a sufficient diagnosis ; but the spasms themselves are dissimilar. In *mort de chien*, the affection is not confined to a particular class of muscles ; it passes from one to another, and those of the neck, face, and back, are almost always exempted. Neither is it a *rigidity*, but a fixed *cramp* in the belly of the muscle, which, as Mr. Curtis justly observes, " is gathered up into a hard knot with excruciating pain." Lastly, the vascular system is infinitely more affected in *mort de chien* than in tetanus, and the fatal termination, beyond all comparison, more rapid.

Nor is this investigation of the *proximate cause* of Cholera, a subject of mere curiosity ; it is highly useful ; inasmuch as it strongly confirms and elucidates the principle which I have kept in view through various diseases in this essay ; and what is of more consequence, it points directly to the most indispensable part of the cure, in the awful and terrific forms which the disease assumes in these parts of the world—namely, *the early restoration of balance in the circulation and excitability ;* an indication but little dreamt of in the old *bilious theory*, where every eye was kept fixed on the lurking demon—BILE !

" In strong habits," says Dr. Paisley, " when the pulse keeps up, evacuations should be promoted both ways, by a vomit of two or three grains of *emetic tartar.*"—*Curtis*, p. 86. But soon after, he observes, " In relaxed habits, where the pulse sinks suddenly, and brings on immediate

danger, the *same method must be pursued,* but with greater caution. The emetics and purges must be gentle, and made cordial with wine, and sp. lavend. Laudanum must be at hand, *to gain time:* and though it is a *dangerous* expedient to *suspend evacuations where putrid bile lurks,* yet, of two evils, the least is to be chosen; for the patient must sink to death, if a respite from evacuations, pain and spasm, is not procured." Nothing so true as this last. Nature is here, as it were, stunned with the blow; and the struggling efforts which she makes to relieve herself, by vomiting, &c. only exhaust her the sooner, if not effectually assisted by art. We must, therefore, have recourse to more powerful means than wine, laudanum, or lavender. The warm bath—cordials of the most stimulating kind, such as warm punch, or toddy, must be added to opium and calomel, together with friction, hot flannels, &c. In short, every means must be tried to determine to the surface, restore the equilibrium of the circulation and excitability, and with them natural perspiration (not the clammy fluid forced out by pain and spasm, but a mild, warm sweat) and biliary secretion. Calomel must never be omitted, because it answers a triple purpose: —it allays the inordinate gastric irritability—it excites the action of the liver—and it corrects the constipating effects of the opium; so that, when the orgasm is over, some gentle laxative medicine may, with it, carry off the diseased secretions, which must sooner or later take place, if re-action can be brought on, or recovery effected. When all medicines by the mouth have been ineffectual in allaying the orgasm of the stomach and bowels, laudanum, by way of injection, has succeeded, and should be had recourse to, though it is generally neglected. I have only slightly mentioned venesection, though from its instantaneous good effects in three desperate cases, I am inclined to think it might prove a powerful auxiliary in relieving the brain, and other internal organs, when overwhelmed with blood, even anterior to re-action; and also by moderating the violence of the re-action itself. This idea is strengthened by the success which has lately attended depletion in various forms of *spasmodic diseases,* and by the following communication from my able friend, Mr. Sheppard:—"Your account of Dr. Moulson's paper brings to my recollection a practice somewhat analogous (though with a different intention) which I pursued during a short service in the Brazils, a few years since, in the violent form of cholera, which seems to be endemic there. You have, I believe, described a similar disease, in India, under the name of *Mort de Chien,* in which you recommend bleeding with other remedies; but I have now reference only to the notes which I made of your book, and therefore am not positive. In more than forty cases which came under my care, during the four months we were in the harbour of Rio Janeiro, and on the coast, I found bleeding to *syncope* instantly and uniformly successful *alone.* There was no critical biliary discharge, but the disease was removed before the arm was secured, and no subsequent medicine was

required. The intestinal spasm was far more violent than any I had ever witnessed in the West Indies (where the disease is pretty severe), and bore a strong resemblance to the convulsive paroxysm; so much so, that I was generally called to patients said to be in fits; and the powers of several men were required to restrain them. The first cases I treated by warmth, frictions, volatiles, and opium, but did no good until I adopted the plan I have mentioned, which, in no instance disappointed me: the variations of temperature in that climate are extraordinarily great, frequent, and sudden: and to such mutations the prevalence of intestinal spasms may be ascribed."

"I had heard much," says Mr. Curtis, "of latent and lurking bile, as the general source of India diseases, and resolved to seek for and hunt it out, by the means employed by others—viz. repeated small doses of sal. glaub. in aq. menthæ piper. sharpened with a very small proportion of emetic tartar. This plan was accordingly tried with our next patient. He threw up a *very small quantity* of greenish-coloured bile, and the solution operated much downwards, without any relief or discharge of bilious matter."—*p.* 59. After the warm bath, opium, and mulled wine, had been tried without success, Mr. Curtis continues.—"A warm purgative glyster was given him, but was followed by no *bilious discharge*. No vomiting continued after the first exhibition of the purgative, but a repetition of it, to see if *any bile lurked still in the stomach*, and could be solicited downwards, brought on continued retching, and he threw up every thing after this till his death."—*ib.* Mr. Curtis now gave up the pursuit of "lurking bile," and saved his next two patients by the warm bath—frictions with hot arrac—wrapping them up in blankets, and supplying them with warm tea and arrac, till perspiration broke out, when they were relieved, and soon recovered.

It is only necessary to remark, in conclusion, that in the milder cases of *Mort de Chien*, corresponding to common *Cholera Morbus*, when the bilious vomiting and purging appear, Nature has then repelled the original cause of the disease, and is fast advancing with the cure. We have only now to moderate and regulate her hurried, and, as it were, frightened movements, by opium and calomel, in pretty large doses; the former, as I have before hinted, in glyster; and when all is quiet, to carry downwards, by mild laxatives, the *effects* of the disorder, and its cure—DISEASED SECRETIONS OF BILE.

The following is given as a digest of the valuable reports of Bengal, Madras and Bombay. Being compiled from official sources, it has been as much as possible divested of all medical reasoning.

It is not intended to enter into any discussion respecting the forms of cholera, or the diseases supposed to have been cholera, which may be thought to be described by European writers of ancient and modern times, as having prevailed in Europe.

[*Nosological Remarks.*] Cholera has generally been classed by Nosologists under the head of Fluxus; but Cullen, though retaining the name, which he understands to signify "a flux of bile," and defining the disease to be so, or of "a bilious humour," places it in his class, Neuroses, and constitutes it a genus of the order, Spasmi. Dr. Good, in his late valuable work, the Study of Medicine, retains the generic term Cholera, which he justifies on the ground that the "bile is morbidly affected in its secretion, either in quantity or quality;" and he places it in the class Cæliaca, or diseases of the digestive function, and in the order Enterica, or diseases affecting the alimentary canal.

[*Names given to Cholera by the Hindoos.*] The quotations which have been given from Hindoo writings, shew, that cholera, or at least, two diseases resembling it, are also there classed, either under the head of nervous diseases, or of disorders of the digestive organs. The native practitioners know the disease by the name of Vishuchi, or Vishuchiki; but the people in general designate it only by two words, signifying in their respective languages, *vomiting and purging*. The term "Neercomben," mentioned by Mr. Hay, as being in use with the natives of Travancore to express the disease, does not appear to be known to the natives of the Coromandel coast. [*Mordixim.*] The word Mordixim, mentioned by several modern authorities, is incidentally introduced by Bontius in his description of the Hog-stone, who says, that "it (the Hog-stone) is infused in wine for the *Cholera*, which the Islanders (Malays) call Mordexi." Sonnerat has been accused of translating, or transforming this word into Mort de Chien; but independently of there being no such phrase in the French language, it is manifest, from the quotations already given, that Mort de Chien was in current use among our soldiers and sailors at the time Sonnerat wrote his book: he does not apply it, indeed, to cholera, but to an indigestion or cholic, in which sense it is in current use with the Portuguese at this day.

[*Generic Name.*] The generic term, cholera, being consecrated by universal, and almost immemorial use, it would not, perhaps, be proper to reject it, even could we propose another, demonstrably better; or prove satisfactorily, that bile, either in its quantity or quality, has no connexion whatever with the cause of the disease; but the specific terms may admit of some observations. We have had no other method in this country of distinguishing between the two forms of the disease, than by retaining the old, and, according to Dr. Good, the pleonastic appellation of *Cholera Morbus*, signifying that form wherein bile appears early, or from the first, in the discharges from the alimentary canal, and in which the circulation is not remarkably depressed: and by applying the adjuncts *spasmodica* or *epidemica* to the second, or that form wherein bile, in common with the

other glandular secretions, disappears, and where the pulse sinks, or ceases to be felt.

[*Description of Cholera.*] The symptoms of cholera can hardly be better detailed than they are by several of the older authorities, whose descriptions of the disease have been quoted, or than in many of the original papers, which constitute the chief value of this work. The descriptions given in Mr. Jameson's and Mr. Orton's publications are likewise of the highest value, and little more is left to be desired on that head, than a few brief and supplementary observations.

This most formidable disease does not appear to be attended by any premonitory symptoms which can be regarded as being at all peculiar to it; on the contrary, we may safely assert that it is of sudden invasion; for, though a slight nausea, a laxity of the bowels, and a general feeling of indisposition are often found to precede cholera, yet these symptoms are evidently common to many acute diseases; and they are especially frequent in this climate, without being followed by any graver ailment. When such symptoms are found to precede cholera, they might with more truth be regarded as indicating merely a certain deranged state of the alimentary organs, a condition of the body which certainly predisposes a person to an attack of cholera.

The invasion of cholera generally takes place in the night, or towards morning. The patient is sick at stomach; he vomits its contents, and his bowels are at the same time evacuated. This evacuation is of a nature quite peculiar to the disease; the entire intestinal tube seems to be at once emptied of its fæcal or solid matters; and an indescribable, but most subduing feeling of exhaustion, sinking, and emptiness is produced. Faintness supervenes, the skin becomes cold, and there is frequently giddiness, and ringing in the ears. The powers of locomotion are generally soon arrested; spasmodic contractions or twitchings of the muscles of the fingers and toes are felt, and these affections gradually extend along the limbs, to the body. They partake both of the clonic and tonic spasm, but the clonic form chiefly prevails. The pulse, from the first, is small, weak, and accelerated; and, after a certain interval, but especially on the accession of spasms, or of severe vomiting, it sinks suddenly, so as to be speedily lost in all the external parts. The skin, which, from the commencement of the disease, is below the natural temperature, becomes colder and colder. It is very rarely dry—generally covered with a profuse cold sweat, or with a clammy moisture. In Europeans, it often partially assumes a livid hue; the whole surface appears collapsed, the lips become blue, the nails present a similar tint, and the skin of the feet and hands becomes much corrugated, and exhibits a sodden appearance. In this state, the skin is insensible, even to the action of chemical agents; yet the patient generally complains of oppressive heat on the surface, and wishes to throw off the bed-clothes.

The eyes sink in their orbits, which are surrounded by a livid circle: the corneæ become flaccid, the conjunctiva is frequently suffused with blood—the features of the face collapse, and the whole countenance assumes a cadaverous aspect, strikingly characteristic of the disease. There is, almost always, urgent thirst and desire for cold drinks, although the mouth be not usually parched. The tongue is moist, whitish, and cold. A distressing sense of pain and of burning heat at the epigastrium are common. Little or no urine, bile or saliva is secreted. The voice becomes feeble, hollow, and unnatural. The respiration is oppressed, generally slow, and the breath is deficient in heat.

During the progress of these symptoms, the alimentary canal is very variously affected. After the first discharges by vomiting and purging, however severe these symptoms may be, the matter evacuated is always watery, and in a great proportion of cases it is colourless, inodorous, and often homogeneous. In some it is turbid, resembling muddy water; in others it is of a yellowish or greenish hue. A very common appearance is that which has been emphatically called the "conjee stools," an appearance produced by numerous mucous flakes floating in the watery or serous part of the evacuation. The discharges from the stomach, and those from the bowels, do not appear to differ, except in the former being mixed with the *ingesta*. Neither the vomiting nor the purging are symptoms of long continuance. They are either obviated by art, or the body becomes unable to perform these violent actions, and they, together with the spasms, generally disappear a considerable time before death. If blood be drawn, it is always dark, or almost black, very thick, ropy, and generally of slow and difficult effusion. Towards the close of the attack, jactitation comes on, with evident internal anxiety and distress: and death takes place often in ten or twelve, generally within eighteen or twenty hours from the commencement of the attack.

During all this mortal struggle and commotion in the body, the mind remains clear and its functions undisturbed almost to the last moment of existence. The patient, though sunk and overwhelmed, listless, averse to speak, and impatient of disturbance, still retains the power of thinking, and of expressing his thoughts, as long as his organs are obedient to his will. Such is the most ordinary course of cholera asphyxia, when its tendency to death is not checked by art.

A favourable issue is denoted by a rising of the pulse, a return of heat to the surface, inclination to natural sleep, and a diminution or cessation of vomiting, purging, and spasms, these indications being succeeded, after an interval, by the re-appearance of fæcal matter in the stools, of bile, of urine, and saliva.

[*Varieties in the general Features of Cholera.*] Cholera, like other diseases, has presented considerable variety of symptoms; but, before we

proceed to notice its more striking varieties, it is necessary to advert to one feature, which, though not altogether unobserved in other epidemics, may still perhaps be regarded as especially distinguishing cholera; namely, that these varieties are not observable so much in *individual* cases, as in what may be termed *local epidemic visitations*. Thus, when the disease appears epidemically in a town or district, or in the lines of a corps, or the camp of a marching regiment, it may on one occasion be distinguished, throughout, by the absence of vomiting, and the prevalence of purging; on another by the excess of vomiting, and, though more rarely, by the absence of purging. Spasm may be generally present in one instance of invasion; in another it may not be distinguishable. A frequent variety, the worst of all, is that which is noted for the very slight commotion in the system —in which there is no vomiting, hardly any purging, perhaps only one or two loose stools, no perceptible spasm, no pain of any kind; a mortal coldness, with arrest of the circulation, comes on from the beginning, and the patient dies without a struggle. This has frequently manifested itself as the prevailing type; and almost all die who are attacked by it: but, fortunately, it has not usually lasted long—the disease either disappearing, or assuming, during its further progress, a milder or less formidable character.

It would be highly important in a pathological view, could we trace these leading distinctions in the disease to any particular state of the weather, to any local peculiarity, or to any circumstance affecting the food, shelter, or occupation of the people, who may be the subjects of it; but it must be confessed that this is far from being practicable. It appears, on the contrary, to be established that, under circumstances apparently similar in all respects, these modifications of the disease have been found equally to prevail. On the other hand, it may be assumed that a person, in proportion to the vigour of his constitution, and to the unimpaired state of his health, is less liable to be affected with the low form of the disease.

[*Vomiting.*] Vomiting is a prominent symptom of cholera: but there are numerous instances on record where it has been entirely absent. In certain epidemic visitations even, scarcely an individual case has manifested this symptom. In some cases the stomach appears to be freely and perfectly emptied; prodigious quantities of watery fluid being ejected, occasionally with great force. This fluid sometimes resembles what is discharged in pyrosis; at other times it is glairy and ropy. In other cases, the stomach seems to have lost the power of freely ejecting its contents: there is an ineffectual straining to vomit, and a spouting up of any fluid which is swallowed, as if by an effort of the lower part of the œsophagus, rather than of the stomach itself. When full vomiting in these cases has been effected by medicine, relief follows; not, however, in all probability,

by the mere evacuation of the gastric contents, but as a consequence of that change in the condition of the patient, which must necessarily be established before the stomach can resume the action of vomiting. Vomiting is sometimes altogether absent, or, if it has been present, soon ceases, from an atonic state of the stomach, under which that organ receives and retains whatever may be poured into it, as if it were really a dead substance. This is a most alarming state, in comparison with which, the utmost irritability, or almost any other imaginable condition of the part, may be held to be of little danger.

It is not always easy or possible to ascertain what substance imparts the greenish or yellowish hues to the fluids ejected by vomiting: but it is perhaps too readily admitted, that these colours are owing to the admixture of bile. A regular series of experiments, regarding the effects of chemical agents on the gastric and intestinal secretions, and on the matters discharged in cholera, and in other diseases, is certainly a desideratum. The Medical Board have addressed a circular letter to several of their officers on this subject, which it is hoped will ultimately be the means of drawing forth some precise information.*

Supposing, however, that either the yellow or green hue of the matter vomited in cholera, indicates the presence of bile, it is undoubtedly of rare occurrence, especially during the acute stage of the disease. It would appear nevertheless, that apparently bilious matters have been vomited, particularly at the beginning, and towards the favourable termination of

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* On mixing 20 grains of calomel with an ounce of ox-bile, which was previously of a "grass-green colour," the bile assumed the hue of "pea-green." This hue was rendered more intense by the application of heat, and took on a tinge of yellow. After standing 24 hours, the mixture was of "a dark or sap green." The calomel appeared at the bottom like "blue ointment;" and was "unctuous" to the feel. On mixing 40 grains of calomel with an ounce of ox-bile, previously of a "light brown colour with a shade of green," the mixture assumed the colour of "ochre." After standing, it assumed a "grass-green colour." The calomel was discoloured in a less degree than in the former experiment. On mixing 15 grains of calomel with 6 drachms of sheep's bile, which was of a "dark brown colour with a shade of green," the mixture put on a "light pea-green with a tinge of yellow." On subsidence of the calomel, which was apparently unchanged, the bile appeared of a "rich dark green colour." On mixing 40 grains of calomel with two drachms of goat's bile, which was of a "dark green colour," no change of colour took place.

On mixing 4 drachms of ox-bile, of a "light brown colour," with an equal quantity of liquor ammoniæ, the mixture assumed the colour of Madeira wine. Equal parts of sheep's bile and liquor ammoniæ being mixed, the fluid became of a light yellow colour. The bile was previously of a deep yellow.

On mixing equal parts of sulphuric æther, and ox-bile, which was previously of a "pea-green colour," the fluids did not unite. The æther got a "yellow tint: and the bile became of a yellowish hue."

These observations have been kindly communicated by Mr. M'Farland, Assistant Surgeon.

the disease, and even in cases which have ended fatally. The mere presence of bile in the discharges cannot, therefore, be held as decisive against the disease being the cholera, of which we are treating. Worms, especially the lumbricus teres, have been very generally ejected by vomiting: and several medical officers have noticed, that this symptom has even indicated a less dangerous form of the disease. If there be any truth in the observation, it is probably referrible to the *free* action of vomiting, which brings up these animals; this being in itself a favourable symptom.

[*Purging.*] Purging is a more constant symptom of cholera than vomiting; and, in a majority of cases, it is the first in order of occurrence; but, being a less striking deviation from a state of health than vomiting, which instantly arrests the attention, it has usually been treated of in succession to it. This symptom has very rarely been altogether absent: but there seems no reason to doubt that this is sometimes the case. Its absence appears, indeed, to denote a peculiar degree of malignancy in the attack. The accounts given by the patients, however, in respect to their alvine evacuations, are not to be implicitly believed. Their attention is not always drawn to the nature of the discharge: and they are apt to convey very erroneous notions on the subject to the medical attendant. In cases where little or no purging has taken place during life, the intestines have yet been found, after death, to be filled with the conjee-like matter, as if they had wanted energy to throw it off, or as if a stricture had been formed on the lower portions of the gut. The intestinal canal appears to be subject, indeed, to the same influences, and its contents appear to vary, as has been stated to be the case with the stomach, with this exception, that it seems always to have the power of emptying itself of its *natural* contents at the commencement, or during the progress of the disorder. This inference is drawn from the accounts of dissections; for we find no instance recorded of fæces remaining, unless in very protracted cases, when the primary disease has been overcome. The dejections are sometimes made without effort or uneasiness; at others, they are thrown out with great force, which has been compared to the squirt of a syringe. They also sometimes take place simultaneously, with vomiting, spasm, and stoppage of the pulse, as if all these affections originated, at the instant, from one common cause. There is seldom much griping or tenesmus, although the calls are very sudden and are irresistible. Pain on pressure of the abdomen is only occasionally noticed. In advanced stages of the disease purging generally ceases; but in many cases, a flow of watery fluid from the rectum takes place on any change of position. The matters evacuated, after the first emptying of the bowels, have been occasionally observed to be greenish or yellowish, turbid, of a frothy appearance like yeast, and sometimes bloody.

In some cases they are inodorous, in others they have a rank fleshy smell. In one fatal case, pure bile, it is said, was discharged. Perhaps much of this variety may depend on the previous state of the large intestine, especially in Europeans, who so generally labour under a morbid condition of that organ; but by far the most common appearance is that of pure serum, so thin and colourless as not to leave a stain on the patient's linen. The next in order of frequency is the conjee-like fluid; the mucus is at times so thoroughly mixed, however, with serum, as to give the whole the appearance of milk or chyle. Worms are very commonly discharged by stool. The re-appearance of fæcal matter, especially if tinged with bile, seldom, perhaps never, takes place till the disease has been subdued. The quantity of the clear watery fluid, which is sometimes discharged, is exceedingly great; and, were it uniform, it might afford us an easy solution of the debility, thirst, thickness of the blood, and other symptoms; but it is unquestionable, that the most fatal and rapid cases are by no means those which are distinguished by excessive discharges. *We have innumerable instances, on the contrary, of death ensuing after one or two watery stools, without the development of any other symptom affecting the natural functions. Even collapse has come on, before any evacuation by stool had taken place.**

[*Of the Animal Functions.*] Though the animal functions necessarily partake of that disorder of the vital and natural functions which very strikingly characterises cholera, yet this participation is not so immediate as we might, à priori, be led to expect.

The undisturbed state of the mind has been the subject of general remark; but it cannot be matter of surprise should some exceptions occur, from a fortuitous morbid affection of the brain following a state of sanguineous congestion. There is reason to believe that the simple congestion observed in cholera has not been the cause of the coma or insensibility which have been remarked; and, when we recollect that almost all practitioners advert to the great reluctance of the patient to be aroused, we must admit, that cases of imputed coma may have often been referrible to this condition, which have yet been reported as arising from physical disability. Instances are not wanting of patients being able to walk, and to perform many of their usual avocations, even after the circulation has been so much arrested, that the pulse has not been discernible at the wrist. Much seems to depend on the constitutional strength and firmness of mind in the patient, and on the form in which the disease has made its attack. The cases here alluded to, are those chiefly in which it has

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* I have never seen such a thing in this country.—J. J.
In India, such instances take place only at the outset of an epidemic seizure.—J. R. M.

begun by an insidious watery purging: and many lives have been lost in consequence of the patients, under these fallacious appearances, not taking timely alarm, and applying for aid. In other cases again, the animal functions appear to have been early impaired, and the prostration of strength to have preceded most of the other symptoms.

[*Spasm.*] Spasm has been held to be so essential a feature of that species of cholera, of which we are treating, as to confer on it a specific name. In so far, however, as relates to the muscles of voluntary motion, and it is that description of spasm only, which we mean here to treat, no symptom is more frequently wanting. Spasms of the muscles chiefly accompany those cases in which there is a sensible and violent commotion in the system. Hence they are more frequently found in European than in native patients; and in the robust of either, than in the weakly. In the low, and most dangerous, form of cholera, whether in European or native cases, spasm is generally wanting, or is present in a very slight degree. The muscles most commonly affected are those of the toes and feet, and calves of the leg; next to them, the corresponding muscles of the superior extremities; then those of the thighs and arms; and, lastly, those of the trunk, producing various distressing sensations to the patient. Amongst these, hiccup is not unfrequent, but it has been observed that this symptom, in cholera, is not at all indicative of danger. The muscles of the eye-balls have not been observed to be affected with spasm, unless the sinking of these organs in their orbits may be considered to be an effect of it. The reports make frequent mention of a remarkable, permanent contraction of the muscles of the abdomen, by which the belly is drawn towards the spine. The spasms attending cholera are of a mixed nature, not strictly clonic: the relaxations being less prompt and frequent than in epilepsy or convulsion; and seldom durable as in tetanus. The contractions of the muscles are invariably attended with pain, and some Medical Officers have observed, that a degree of spasmodic stiffness has continued for several days afterwards. It has also been remarked that spasmodic twitchings of the muscles have taken place after death, and have continued for a considerable time. In one case where a man had been paralytic in his limbs, with a total numbness of them, they were severely affected with spasms, and became exquisitely sensible. It is pretty evident, that there either has been an inaccuracy in the description of spasm occurring in cases of cholera, or a sensation differing from that of spasm has been confounded with it; for, by the descriptions, we would be led to suppose that the spasms begin, and are felt, *in* the toes and fingers, which cannot be the case. As the extreme muscles however are generally first seized with spasm it is probable that the small fleshy bundles in the palms of the hands, and soles of the feet *are* affected; but there seems reason farther to conclude, that pain *is* really felt *in* the fingers

and toes, and that it is referrible to a sort of nervous twinge or tic douloureux in these parts, distinct from spasm, which is not uncommon in other disordered states of the digestive organs.

[*Collapse.*] Of all the symptoms of cholera, none is so invariably present, none indeed so truly essential and diagnostic, as the immediate sinking of the circulation. It must nevertheless be admitted, that, where instant remedial measures have been successfully practised, this symptom may not have developed itself; and that there are even cases, where an excited vascular action has been observed to accompany the first movements of the system in cholera. Some intelligent practitioners have entertained doubts whether such cases belong indeed to this disease; and there seems reason to imagine that those inflammatory affections with spasm, known in this country, and alluded to in several reports, may, in some instances, have been mistaken for it. It is farther to be remembered that these are precisely the cases, which yield most certainly and readily to our remedial means: and it consequently follows, that a medical man can seldom have the opportunity of observing, whether or not, this form of cholera will degenerate into the low stage. There is, however, direct evidence in support of the fact, that they have so degenerated and gone on to a fatal termination. In the case of soldiers too, in whom such symptoms have chiefly appeared, we must make some account of the quantity of spirits usually drank by them at the commencement of the disease, producing an effect on the circulation. The period at which a marked diminution of vascular action takes place, is somewhat various. The pulse sometimes keeps up tolerably for several hours, though very rarely. It more generally becomes small and accelerated at an early stage; and, on the accession of spasm or vomiting, suddenly ceases to be distinguishable in the extremities. The length of time, during which a patient will sometimes live in a pulseless state is extraordinary. Dr. Kellett relates a case, where the pulse was gone within three hours from the attack; yet the man lived in that state, from the 3d October at 4, P.M., to the 6th at 2, P.M. On the cessation of the spasms or vomiting, and sometimes, apparently, from the exhibition of remedies, the pulse will return to the extremities for a short time, and again it will cease. The superficial veins and arteries are not always collapsed, even when the pulse has ceased. If these vessels be opened in this condition, the contained blood flows out; their walls then collapse, and no more blood can be extracted. There is no authenticated fatal instance of cholera on record, where the circulation has not been arrested, in the extremities at least, long before death took place. The only apparent exception to this conclusion would not have been deemed deserving of particular attention, were it not, that in the faithfulness of record, which it is hoped distinguishes this report, nothing, purporting to be a medical fact or observation, is omitted. The case is this.

"Scarcely any disease occurred on the march, with the exception of a few cases of cholera; of these, a havildar and sepoy died, and several followers, who seldom were reported in time to receive any aid. One of the last class, a fine stout young man, a bullock-driver, was brought to the hospital almost in the last agony; I mention this case from the peculiarity of the patient's skin being hot and dry, and his pulse being about 120, full and strong, until the last moment, circumstances I had never seen before; while from the peculiar appearance of the eyes, and the collapsed features, together with the description given of the attack, and progress of the disease, left me no room to doubt its being genuine. 1st July, 1821." The writer of the preceding extract notices the case for its singularity; and, in judging of its identity with cholera asphyxia, we must allow due weight to the circumstance of his attention being thus excited. He acknowledges, however, that the patient was brought to him in the last agony, and draws his conclusions from the reports of the manner of attack and progress of the disease, and from the appearance of the features of the face. We are left to conjecture as to the former of his grounds of belief; and shall, therefore, only hint at the possibility of coup de soleil having been mistaken, *on description*, for cholera: but the sudden collapse of the countenance, which takes place in cholera, seems hardly reconcileable with any condition of body in which the skin is dry and warm, and the *pulse full and strong!* That peculiar state of countenance is manifestly the result of the retrocession of the blood from the surface; and it is quite distinct from the wasting of the solid parts from disease, or inanition. That a case of cholera may terminate in death, and the pulse remain *at* 120, *full and strong*, to the last moment, is not physically impossible, although at present standing single on the records: but, when supported by hearsay evidence, and by an observation, which, it has been attempted to shew, is not tenable, we may be allowed to regard it as one of those *facts* alluded to in the beginning; and, being palpably at variance with general experience, it is to be weighed with much caution and circumspection, if not totally rejected.

[*Thirst and sense of heat in the Epigastrium.*] Thirst, and a sense of heat, or burning, in the region of the stomach, are generally connected together, and form very prominent and constant symptoms of cholera: yet, not only in individuals, but even in epidemic invasions, these symptoms, have often been altogether wanting. Even when they are present in the highest degree, the mouth is not often parched, nor the tongue often dry; on the contrary, there seems in general no want of moisture; and while, as Mr. Jameson observes, "all is burning within," these surfaces are cold and blanched. At times, however, the mouth is parched, and the tongue dry and furred: but practitioners seem doubtful, whether any practical inference is thence to be drawn. What would be the state of these parts,

if calomel, ardent spirits, laudanum and spices were as largely employed in health, or in many common diseases, as in cholera, with as scanty a use of diluents? Might we not perhaps say, that a parched mouth and furred tongue, following the exhibition of such remedies in cholera, is rather favourable than otherwise, as indicating an action counter to that of the disease? When thirst *is* present, it seems to subdue all other feelings; and the ignorant soldier, as well as the medical man, who firmly believes that cold water is almost certain death, alike eagerly seek and swallow it. Two melancholy instances are recited, where Medical Officers have exerted their last and utmost efforts to reach, unperceived, even the water of the bathing tub; so intolerable are the pangs of this cruel thirst.

[*State of the Skin.*] The state of the skin in cholera is, in general, what we might expect to find it in patients labouring under such affections of the alimentary canal, and with the subdued circulation, which takes place in that disease. It is cold, generally clammy, and often covered with profuse cold sweats. Nevertheless, varieties occur in this, as in the other symptoms of cholera. The skin is sometimes observed to be dry, though cold; and sometimes of natural, nay, in some rare instances, of preternatural warmth. An increase of temperature has been repeatedly observed to take place just before death; but the development of heat appears to be confined then to the trunk and head; and, in almost all cases, this *partial* development of heat is found to be a fatal symptom. It is entirely unconnected with any restoration of the energy of the arterial system, or any improvement in the function of respiration. The heat, in such instances, has been observed to continue considerable for some hours after death.

The sensation imparted by touching the skin of a person ill with cholera is very peculiar, and reminds one of that imparted by a dead body. The skin, when much collapsed, becomes insensible, even to the action of chemical agents; and hence the usual vesicatories fail in producing any effect. The application of mineral acids, and of boiling water, in this condition of the skin, produces little or no effect, and some patients are said not to have been sensible of the operation.

The action of mineral acids on the skin is not, however, vesication, but rather that of a cautery; the cuticle, and the extremities of the subjacent vessels, appearing to be destroyed by them. It has been said, that vesication could not be produced in some stages of cholera, because the production of serum was, in common with the glandular secretions, arrested; but, when we reflect on the readiness with which serous fluids are poured out in that disease, we shall be rather disposed to refer the failure in the action of vesicatories, even of hot water, to the diminution or destruction of the nervous energy of the skin. It is certain that, in a body *but just dead*, the application of boiling water will vesicate readily; and, if the accuracy of the observation respecting its non-vesicating power in advanced stages of cho-

lera be established, we must infer, that there is less vitality in the skin in such cases, the patient being still alive, than in that of a body *recently* dead of some other disease.

At a very early stage in cholera, leeches can procure little or no blood from the skin. This fact is noticed by some in another sense, as if these animals turned in abhorrence from the skin of a person ill with cholera. When the sweat is thin, it is usually poured out, in large quantity, from the whole surface of the body; but, when thick or clammy, it is more partial, and generally confined to the trunk and head. The action of the vapour, and hot baths, seems unquestionably to increase the exudation, or secretion from the skin; and the application of dry heat, as the natural temperature of the skin augments, appears to restrain these discharges; circumstances not very compatible with the supposition of a state of spasm of the vessels of the skin. The perspiration or moisture is often free from odour; at other times it has a fetid, sour, or earthy smell, which has been said to be peculiarly disagreeable, and to "hang long about the nostrils" of the bye-stander.

[*Countenance.*] That remarkable shrinking of the features of the face, which has acquired the emphatic term of the "true cholera countenance," appears in every case, not quickly cut short by medicine; but the degree, in which this symptom may be present, will be differently estimated, according to the natural contour of the patient's features. This expression of countenance, which conveys too truly that of death itself, cannot be mistaken; and, by an attentive observation it will be perceived, that a similar shrinking takes place throughout the limbs and all projecting parts of the body. The eyes not only become dim, and the corneæ flaccid, but there appears to be an actual formation of a substance like a film, or membrane, in many cases: shewing, that this species of surface still possesses secreting powers. The abdomen has sometimes been observed to be tumid, but more frequently drawn towards the spine. The general apparent reduction of bulk cannot, however, be considered as proportionate to the volume of fluids thrown out; nor, indeed, to depend essentially on that circumstance, as it occurs equally under the most moderate discharges.

[*Respiration.*] Respiration is not usually interrupted in the early stages of cholera, unless from a peculiarity in the mode of attack, under which spasm seizes the muscles subservient to that function. In many cases terminating in death, respiration has gone on in its mechanical part with little or no interruption, except that it becomes slower and slower; and an instance has been recorded, where this function was performed only seven times in the minute. Numerous cases, on the other hand, are noticed, especially in Europeans, where the interruption of respiration was most distressing, and could only be compared to the most violent attacks of asthma.

Although the breath is stated, in many of the reports, to have been deficient in heat, it is not clear that this was a general symptom; nor is it understood that this coldness was more particularly observed in cases of difficult and laborious respiration, than in those where this function seemed to be, at least mechanically, performed without interruption.

[*Jactation.*] With respect to restlessness, or jactation, it is more common with Europeans than with natives. In cases of such sudden and dangerous illness, we must make some allowance for moral, as well as physical disquietude; and it is certain that, in very many cases, death approaches while the patient lies in the most complete tranquillity. When much restlessness prevails, it is probably connected with some great oppression of particular organs: and though the absence of this symptom is not, in itself, to be depended upon, as affording grounds for a favourable prognosis, its presence is always highly alarming. The voice, in general, partakes of the debility prevailing in other functions, and is usually noticed as being feeble, often almost inaudible. Yet instances are not wanting, where the voice has continued of natural strength almost to the last moment.

[*Functions of the Sensorium.*] In a disease so highly congestive as cholera, where vertigo, deafness, and ringing in the ears often prevail, and where very large quantities of opium and intoxicating matters have been swallowed, it is truly surprising that the functions of the sensorium are so very rarely disturbed. It seems probable that it is, in many instances, from an inaccuracy of language, that coma has been represented as a symptom of cholera; for we find that patients, who have just been represented to be in a *comatose* state, can with more or less facility be roused from it; and, though he cannot overcome that retirement within himself which constitutes so remarkable a feature of the disease, he will yet evince, by the clearness and precision of his answers, that his intellect is not destroyed. The same appearance takes place in tetanus, hydrophobia, and other diseases referred to the class of neuroses. This circumstance shews their affinity with each other, and is calculated to make us pause in receiving doctrines as true, which impute such disorders to depraved functions of the nerves, whose origin, the sensorium commune, nevertheless, remains comparatively undisturbed. Coma must, however, be admitted occasionally to occur, especially towards the termination of the case, when it is fatal; but delirium has seldom or never been observed, unless as a sequela of cholera, when other and foreign morbid actions have been established. That degree of incoherence, which has accompanied the excessive spasmodic affections of the muscles, or which has followed the free use of opium and spirits, is not considered as an exception to this remark.

Syncope is not a common symptom in cholera, and when it has occurred, unless after venesection, it has generally been on the invasion of the dis-

ease. During the progress of this disorder, when the nervous energy seems to be almost annihilated, and the functions of the heart and arteries to be abolished, this symptom is yet very rarely observed! Deafness has been remarked, in some instances, to have been completely established, before any other symptom of the disease had developed itself; the patient continuing, for a time, to pursue his ordinary employments.

[*Recovery.*] When medical aid is early administered, and when the constitution is otherwise healthy, *the recovery from an attack of cholera is so wonderfully rapid, as perhaps to be decisive of the disease being essentially unconnected with any organic lesion.* In natives of this country especially, in whom there is ordinarily very little tendency to inflammatory action, the recovery from cholera is generally so speedy and perfect, that it can only be compared to recovery from syncope, cholic, and diseases of a similar nature; but in Europeans, in whom there is a much greater tendency to inflammation, and to determinations to some of the viscera, the recovery from cholera is by no means so sudden or so perfect. On the contrary, it is too often involved with affections as various as the diseases of these viscera are known to be in this climate. The most frequent of the sequelæ of cholera are affections of the intestines, of the brain, of the liver, and of the stomach. When cholera, however, is of long continuance, and when the *congestion* appears to have been thoroughly established, few, either Europeans or natives, who outlive the attack, are restored to health without considerable difficulty.

It has been already remarked, that recovery from an attack of cholera is indicated by the return of heat to the surface of the body, and a rising of the pulse. A deceitful calm, however, sometimes attends these favourable appearances, which too often mocks our hopes and expectations. When the disease is characterised by violent morbid actions, the diminution or cessation of these, however sudden, may generally be regarded as the usual mode in which Nature conducts the patient to recovery; but, in what may be termed *negative* symptoms, the steps to recovery are extremely dark and obscure, and the evolution of natural heat and arterial action have occasionally been noticed as amongst the last of the functions which are restored. Patients have been observed to remain for one, two, and even three days in a state of the greatest collapse, and yet, contrary to all expectation, have recovered.

[*Urine.*] In cholera, the secretion of urine, like all the other natural secretions, appears to be very generally suspended. This, indeed, has been considered so much a matter of course, that practitioners have very frequently not noticed it in their reports; but, wherever the secretion has appeared to be going on, the circumstance is particularly mentioned. When cholera first appeared, attempts were often made to relieve the pa-

tient by the catheter, under the supposition that the absence of urine was owing to *suppression*. When this secretion is not suspended during an attack of cholera, the urine is almost always limpid and clear, though in very small quantity—a curious phenomenon, considering the probable state of the blood under such circumstances; for we may be permitted to infer, from all the symptoms, that the blood is not only deprived of much of its serous or aqueous parts, by the profuse discharges which usually take place, but that the elements of all, or most of the other natural secretions, are retained in it. We might, therefore, naturally have expected that, if urine were secreted at all, it would possess some striking deviation from its natural appearance. Admitting that the blood is not freed from the elements of the secretions, which usually take place in health, what effect may their presence be supposed to have in producing some of the symptoms of the disease?

It has been remarked, that the cases in which urine appeared to be secreted, were not less dangerous than those where this secretion was entirely suspended; but it is much more generally observed, that the appearance of urine, especially when this is the result of *restored* secretion, is always a most favourable omen. In many cases, the secretion of urine has not been restored, before a period of 50 hours had elapsed from the commencement of the attack; and it has even been reported that, during a local prevalence of cholera, the secretion of urine has been, in some individuals, entirely suppressed, although no other derangement of the health took place. Instances of this kind were generally observed during great heats, and under much fatigue.

[*State of the Blood.*] No symptoms of cholera are so uniform in their appearance and progress, as those connected with the blood and its circulation. Although the reports, in general, afforded ample reference to this point, it still appeared to the Medical Board, to be one of such importance in the pathology of the disease, that a circular letter was addressed to about thirty Medical Officers, who were supposed, from their experience in the treatment of it, to be best qualified to afford information. Attention was especially directed to the following considerations: first, the influence which the state of the blood, in those affected with cholera, might be supposed to have in producing some of the symptoms; second, the colour of the blood abstracted from a vein in a person affected with cholera; third, the colour of the blood after a certain quantity had been taken, and the effect which any alteration of colour might have on the condition of the patient; fourth, if arteriotomy had been practised, the colour of the arterial blood in cholera; and, lastly, the period from the first attack of the disease, at which blood was abstracted. It is established by the replies to this letter, as well as by an immense mass of concurrent evidence, that the blood of persons affected with cholera is of an unnatu-

rally dark colour and thick consistence. These appearances are very uniformly expressed by the terms dark, black, tarry, in regard to colour; and by thick, ropy, syrupy, semi-coagulated, in respect to its consistence. The change in the condition of the blood is likewise fully proved to be in the ratio of the duration of the disease; the blood, at the commencement, seeming to be nearly or altogether natural, and more or less rapidly assuming a morbid state as the disease advances. Some very rare cases are recorded, where, however, this morbid state of the blood was not observable, although the disease had been for some time established; and instances have occurred where the blood flowed readily, sometimes little altered, where, nevertheless, death ultimately ensued. The abstraction of blood has been found by all practitioners to be very difficult and uncertain; and the uncertainty has been variously imputed to the feebleness of the circulation, to the thick consistence of the blood, and to the combined operation of these causes. The blood drawn from patients suffering under cholera, is stated to be generally very destitute of serum, never to exhibit the appearance of buff, and to be generally disposed to coagulate quickly. Several instances, however, have occurred, where the coagulation was slow and imperfect. A great majority of the reports state unequivocally, that, after a certain quantity of dark and thick blood has been abstracted from a patient under cholera, it is usual for its colour to become lighter, its consistence to become less thick, and for the circulation to revive—such appearances always affording grounds for a proportionably favourable prognosis. In many instances, however, no such changes have been observed to accompany the operation of bleeding, while yet the result was favourable. The blood is generally found to be less changed in appearance, in those cases of cholera which are ushered in with symptoms of excitement, than where the collapsed state of the system has occurred at an early period. The blood has been occasionally found on dissection, to to be of as dark a colour in the *left*, as in the *right* side of the heart, affording reason to believe that, in the whole arterial system, it was equally changed. The temporal artery having been frequently opened, the blood was found to be dark and thick, like the venous blood; but it would appear that this operation has not been performed, in general, until the attempts to procure blood from the brachial or jugular veins had failed; little or no blood could be obtained, the artery merely emptying itself in a languid stream, not in a jet, and then collapsing. An instance is stated where the surgeon, despairing of other means, cut down upon the brachial artery; but so completely had the circulation failed, that no blood flowed. When re-action has been established, the blood occasionally shews the buffy coat.

It would have been highly interesting, if, in those cases of cholera which were distinguished by the freedom of the mechanical part of the process of respiration, and by the absence of great alvine or cuticular

watery discharges, the colour and consistence of the blood had, in a greater number of instances, been ascertained. The evidence on these points, however, must be acknowledged to be defective. Amongst natives, respiration is pretty generally free until the very last stage; and the colour and consistence of the blood, in the instances where venesection has been performed, has been very uniformly stated to be dark, whether excessive discharges prevailed or not. It may thence be allowable to conclude, without any farther particular evidence, that though the passage of the blood through the lungs has been free, its natural change is interrupted by cholera. The coldness of the body in cholera, not only on the general surface, but in the axilla, as ascertained by the thermometer, might also warrant us in concluding, that the *temperature* of the blood is under the natural standard; but the inference is not sufficiently established by accurate observation. With respect to the watery discharges, we are not always sure that, during life, the stomach or intestines have been emptied. These organs have sometimes been found, after death, to be filled with fluid, though no purging or vomiting had been observed. Although, therefore, the thick consistence of the blood would seem to find a ready explanation in the circumstance, of the profuse excrementitious discharges robbing it of its natural serum; and, although the general tenor of the reports would seem to warrant the conclusion, it must yet be confessed there is reason to believe, that the blood has been found occasionally to present these appearances when no such discharges had taken place.

[*The Terminations of Cholera.*] The terminations of cholera will readily be apprehended from the observations which have already been made. It is the declared opinion of many of the practitioners who have had to cope with the disease, that its tendency to death is so great, as never to be counteracted by the unaided efforts of nature. The same opinion is no less evidently implied by the observations of all, that the delay of but a few hours places the patient beyond the reach of art; for hours are, in this disease, as days in any other. There are not wanting men, however, who, either from an affectation of singularity, or from the melancholy results of their own practice, are said to doubt the power of medicine in the cure of cholera, and to ascribe the recoveries which they have witnessed, to the natural unaided powers of the constitution. Such feelings are too apt, indeed, to arise in the mind, when the sad experience of some malignant epidemic visitation, or a succession of intractable cases, comes to be contrasted with the more successful efforts of others, who have had a less formidable enemy to combat; but they are especially apt to arise on hearing of the reputed cures made by the aid of native establishments. It is obviously very difficult to arrive at the means of making a true estimate on this subject. Where the aid of the European practitioner has been ap-

plied, the mortality has still, undoubtedly, been extremely great; and the accounts of native doctors cannot be at all relied on, either for their veracity, or their qualifications to discriminate the disease. Such of the reports of the native revenue servants as have come under the observations of the Medical Board, all tend to prove, that by far the greater proportion of people who suffered attacks of cholera, and had no efficient aid, died. The Ameen of Ganjam writes thus; "The people who get the cholera morbus never recover; death to them is certain." The Resident at Hydrabad states, that he feared every case treated by the natives proved fatal. The family of a wealthy Nair in Travancore, consisting of 19 people, were all, save one, cut off in a few hours. Another family of five all died. Mr. Searle, at Mannatoddy, states, that of 28 villagers attacked with cholera, 26 died: the other two recovered by his assistance. Death may, therefore, be said to be the ordinary termination of cholera; and there is, in truth, very little variety in the course which the disease pursues towards it. This has already been described as consisting in a general suspension of the natural and a gradual cessation of the vital functions, rather than in the establishment of morbid actions. Cases have been remarked, where the vital functions have been more suddenly overcome, and where death took place before the usual development of the symptoms; others, where life is extinguished in some sudden convulsive commotion of the system; and some, as if from apoplexy. Fatal terminations likewise occur from topical inflammations supervening; as, gastritis, enteritis, or hepatitis.—The intestinal canal seems especially obnoxious to the effects of cholera, numbers of those attacked with it, having subsequently been seized with dysentery. The favourable issue of cholera certainly resembles that of diseases usually called spasmodic, unless in cases, where it has lasted so long as to involve other trains of morbid actions, connected with organic lesion; or with a febrile affection of the sanguiferous system. *As its fatal termination has been stated to be effected by a suspension of the natural, and a gradual cessation of the vital functions, so its favourable termination may be stated to be simply a restoration of these functions; a change, which usually takes place with considerable rapidity, and which often arises under circumstances apparently the most desperate.*

[*Diagnosis.*] The diagnosis in cholera is seldom involved in any considerable difficulty, or obscurity. Where the evacuations are tinged of a yellow, or greenish hue, where the matter vomited is bitter to the taste, while the skin remains warm, and the pulse good, the disease may be regarded as bilious cholera, commonly so called:—but, where, after the first emptying of the primæ viæ, the evacuations are of a watery consistence, colourless, turbid or white; when no urine is voided; where the surface becomes cold; where the features are collapsed; where the spirits are greatly depressed; and where the pulse quickly flags, the case may almost

certainly be regarded as the true Asiatic, or spasmodic cholera. As the disease advances, the cessation of the pulse in the arteries of the extremities, the shrivelled and corrugated skin of the hands and feet, the restlessness, deafness, and general depression, leave no doubt of the nature of the disease. Many affections denominated nervous, such as syncope, cholic, hysteria, dyspepsia, spasm of any kind, and the cold stage of fevers are apt, during the prevalence of cholera, to create an alarm of it. The remedies applicable to such cases being in general equally appropriate to the treatment of incipient cases of cholera, and their effects in both instances being often very similar, it is much to be suspected that many of the former have been improperly pronounced to be cases of the latter. Cases of cholera sometimes, apparently, commence by an insidious diarrhœa; or supervene on the action of purgatives, especially saline purgatives; and are then exceedingly apt to be mistaken, both by the patient and his physician. All the experience which we have yet had leaves the mind much in doubt whether this diarrhœa be a primary symptom, or merely indicates a predisposition to the disease. The same observation applies to the effect of purgatives. In such difficult cases, much may be inferred from the state of the epidemic influence prevailing at the time. If cholera be prevalent, they will generally attract immediate notice, and it is the safest course to treat them as cholera: but many of our most lamented casualties have happened from seizures of this description, which were solitary, and altogether unsuspected by the sufferers till too late. There seems, however, to be something peculiar to cholera, in blinding the patient to the real nature of his case; or, perhaps, conscious of the tendency of some of his symptoms, he seeks to repress the conviction; and is unable to admit or believe that, with little sensible disturbance of health, he already stands on the verge of his grave.

[*Appearances on Dissection.*] The appearances on dissection, after death following attacks of cholera have been very extensively ascertained, in the bodies of European subjects, but in an extremely limited degree in those of native subjects. This is generally stated to have arisen from the aversion betrayed by the friends of deceased natives to the operation of dissection, as if this aversion were peculiar to them. The truth, however, rather seems to be, that when a European soldier dies, it is extremely rare that there is any person so connected with him as to derive the right of objection to a post-mortem examination; while every native has friends at hand to see the last offices performed to his body. It is probable that were the cases similar in this respect, we should hear as much of the objections of Europeans, as of natives, to dissection of the dead bodies of their friends and relations.

Although dissections are very generally practised in European hospitals in this country, they are performed under some disadvantages, which must

operate to a certain extent, in diminishing the minuteness and accuracy of the information thence derived. The heat of the climate imposes the necessity of interment at a very early period after death; and it likewise imposes the necessity of interring at certain hours of the day, either soon after sunrise, or about sunset. Hence, if a man dies at any time between noon and sunset, his corpse is generally interred the following morning; if he dies any time between sunset and noon, the body is generally buried in the following evening. It follows therefore that there is often but a very limited time allowed for dissection; the pressure of these circumstances, however, not unfrequently leads to the operation being performed so immediately after death as to afford considerable advantages. Dissections have been chiefly made on the bodies of European soldiers, a class of men acknowledged to be peculiarly liable, in this climate, to visceral disease of all kinds. Under these circumstances, dissection reports should be viewed with care, in reference to the general states of morbid bodies; and with the most attentive consideration of the precise import of the terms employed.

The external appearance of European subjects who have sunk under cholera, closely resembles that which has been noticed as taking place during life. The surface is livid, the solids are shrunk, the skin of the hands and feet is corrugated. There seems no sufficient evidence of any uncommon tendency in the body to putrefaction after death, nor of any characteristic fætor from the abdominal cavity. No particular morbid appearances have been found in any of the cavities of the body, which are lined with *serous membranes*, or in these membranes themselves. The cavities of the pleura, of the pericardium, and of the peritoneum have, almost uniformly, been found in a natural state; or, the deviations from that state have manifestly had no connexion with cholera. The surfaces which are lined, or covered with *mucous membranes*, have, on the contrary, very generally exhibited signs of disease. These will be noticed, as the organs connected with them come to be mentioned.

The lungs have not unfrequently been found in a natural state, even in cases where much oppression of respiration had existed previously to death. Much more generally, however, they have been found either to be gorged with dark blood, so that they have lost their characteristic appearance, and have assumed more that of liver, or spleen; or they have been found to be in the opposite state; that is, collapsed into an extremely small bulk, and lying in the hollow on each side of the spine, leaving the cavity of the thorax nearly empty. This appearance has been so remarkable as to induce Dr. Pollock, of His Majesty's 53rd regiment, to conceive that it could only be produced by the extrication of a gas within the cavity of the pleura, capable of overcoming the atmospheric pressure. It is understood, however, that opportunities were had of piercing the thorax of the dead body under water, and that no gas was extricated. As there

appears to have been an absolute vacancy in the cavity of the pleura, that is to say, the lungs did not by any means fill it, it would seem that that viscus had exerted a contractile power, adequate to overcome the pressure of the atmosphere. The blood found in the lungs has been always very black. The heart and its larger vessels have been found to be distended with blood, but not so generally as the apparent feebleness of their propelling power, and the evident retreat of the blood to the centre, would have led us to expect. The right auricle and ventricle being gorged with blood is nothing peculiar to cholera; but some dissections have shewn the left cavities to be filled even with *dark* or *black* blood, which we may reckon as a morbid appearance more peculiar to it. In the abdominal cavity, the peritoneal coverings of the viscera, being *serous membranes*, present in general but little deviation from the healthy state; occasionally, indeed, the morbid accumulation of blood in the vessels of the viscera, imparting an appearance of turgidity and blueness, is evident on their exterior surfaces. We also find them bearing marks of inflammation, especially where the patient may have lingered long before death. In other cases, the whole tube has had a blanched appearance, both externally and internally. The stomach and intestines generally preserve their ordinary volume. The appearance of the omentum is not sensibly affected in cholera. The stomach is found to be so variously affected as to destroy all grounds for pathological reasoning. It is very rarely found empty, or much contracted after death, nor has any appearance of spastic stricture of the pylorus been often detected. It has however sometimes occurred. Its contents appear to be chiefly the ingesta in an unaltered state; in some cases, greenish, or yellow, or turbid matters are found. The stomach has been said to have been found "lined with calomel." Various appearances, either of active inflammation or a congested state of the vessels, have been noticed, sometimes in one part and sometimes in another. The parts seem as if they were sphacelated, thickened, softened, and friable; and, in short, exhibit so great a variety of appearances, from a perfectly natural state to the most morbid, that no particular light is thrown by them on the disease.

The intestinal tube is sometimes collapsed, but oftener found to be more or less filled with air; distended in some parts into bags or pouches, containing whitish, turbid, dark, or green-coloured fluid, and in others, presenting the appearance of spastic constriction. The latter, however, is not common. No fæcal or other solid matters are found in the intestines; but, very commonly, large quantities of the conjee-looking fluid, or of turbid serous matter. The duodenum, and occasionally the jejunum, have been found loaded with an adherent, whitish, or greenish mucus; at other times they have been found seemingly denuded of their natural mucus; and often perfectly healthy. Traces of bile in the intestines, or of any substance apparently descended from the stomach, are exceedingly rare. Sanguineous

congetion, and even active inflammation, are stated to be more common in the bowels than in the stomach ; but, on the other hand, instances are very numerous where no such indications have been detected. The thoracic duct is stated to have been empty of chyle. The liver has been commonly found to be gorged with blood, but not always : it is usually an organ very vascular : and it would probably demand a nicer discrimination than has been bestowed on the subject, to distinguish the degree of congestion in which it is naturally felt by the settling of the blood after death in ordinary diseases, from that which has been observed after an attack of cholera. The gall-bladder has almost universally been found to contain bile, and in the great majority of cases even to be completely filled with it. As is usual with this secretion, in cases of retention, it is of a dark colour. Very different states of the gall-ducts have been described ; cases of constriction and impermeability, seeming to be equally numerous with those of an opposite character.

The urinary bladder is found, we may say universally, without urine, and very much contracted. The lining or mucous membranes of the bladder and ureters, have been found coated with a whitish mucous fluid. The smallness of the bladder after death has been generally adduced in proof of great spasm ; but it is not unfrequently found to be equally small after death from other diseases ; and, it seems the nature of that organ, when it contains no urine, to contract, so as to leave no cavity. Dr. Baillie, in his Morbid Anatomy, thus notices this fact. " The bladder is also found contracted to such a degree as hardly to have any cavity. This is generally not to be considered as a disease, but simply as having arisen from a very strong action of the muscular coat of the bladder previously to death." The appearance of the spleen, which is so various under the ordinary conditions of the body after death, has indicated nothing that can be mentioned as belonging to cholera. The vessels of the mesentery have been very generally found to be uncommonly full of blood.

In the head, appearances of congestion, and even of extravasation have been frequently observed ; but, not so uniformly, nor to such extent as to require any particular notice. Only one case has been given, where the state of the spinal marrow was examined : and in that, indications of great inflammation were detected in its sheath : the case, however, was, in some degree, a mixed one.

From this general view of the appearances found on dissection of the bodies of persons who have died from cholera, it is manifest, that the information thence derivable, is, in a pathological view, of a negative nature only. It is nevertheless, of consequence in a practical sense, especially in treating the sequelæ of cholera.

TABULAR ANALYSIS OF THE INDIVIDUAL REPORTS TRANSMITTED TO THE MADRAS PRESIDENCY.

Name of Medical Officer.	*Premonitory Diarrhœa.*	*General Symptoms.*	*Consecutive Fever.*	*Contagious or not?*
1. Ass. S. Haines,	None mentioned	vomiting and purging, prostration of strength, spasms, languid circulation, sunken eyes, &c. no blueness mentioned	none mentioned	not contagious
2. M'Andrew ...	none ditto	the usual symptoms (no blueness)	none	decidedly not contagious
3. Rogers	none ditto	the usual symptoms, no blueness mentioned	none	no mention of contagion
4. W. Smith....	none; restlessness, vertigo, nausea, borborygmi	the usual symptoms, no blueness	none there was sometimes diarrhœa as a sequela	epidemic & not contagious—one attack does not secure against another
5. Sutton	none	the usual symptoms, no blueness	none	decidedly non-contagious
6. Scott.....	none	usual symptoms, no blueness	none	decidedly non-contagious
7. Sevestrie	none	usual symptoms, no blueness	none	epidemic
8. White.....	none	usual symptoms, no blueness	none	suspects it to be contagious
9. Wyllie	none	usual symptoms instantaneous—no blueness	none sometimes disordered secretions of the digestive organs	not contagious
10. W. Ogilby....	none	usual symptoms, no blue colour	none	contagion mentioned
11. Kelly.....	commenced with diarrhœa, then vomiting & all the other symptoms in rapid succession	usual symptoms, no blue colour	none	endemic and contagious
12. Peyton	none	usual symptoms, no blue colour	none	poison in the atmosphere

Name of Medical Officer.	*Premonitory Diarrhœa.*	*General Symptoms.*	*Consecutive Fever.*	*Contagious or not?*
13. Campbell	none	usual symptoms no blue colour, except blue eyelids	none	non-contagious
14. Shedden.....	none	usual symptoms no blue colour	none	no mention of contagion—considers the disease "more of a diarrhœa than cholera."
15. Dean.....	none; constipation	usual symptoms livid lips	none	epidemic no opinion as to contagion
16. Christy.....	none	usual symptoms no blue colour	none	no mention of contagion
17. Wilson.....	none	usual symptoms no blue colour	none	cannot imagine the cause
18. Boyd.....	no diarrhœa, vertigo, &c.	usual symptoms nails purple	none	no mention of contagion
19. Neilson.....	none	usual symptoms no blue colour	none	no mention of contagion
20. Scarman.....	none	usual symptoms no blue colour	none	no mention of contagion
21. Millar.....	none	usual symptoms purple colour	none	no mention of contagion
22. Cox.....	none	usual symptoms no blue colour	none	no mention of contagion
23. Stone.....	no diarrhœa, head-ache and languor	usual symptoms no blue colour	none	morbific influence of the atmosphere
24. Colclough....	none	usual symptoms no blue colour	none	no mention of contagion
25. Trotter.....	none	usual symptoms no blue colour	none	no mention of contagion
26. Duncan.....	none	usual symptoms countenance and nails livid	none	doubtful "causa latet"
27. Orton.....	giddiness, head-ache, nausea, and griping, loose stools, first symptoms	usual symptoms no blue colour mentioned	no fever mentioned	convinced it is not contagious
28. Owen.....	none	usual symptoms no blue colour	none	no mention of contagion

Name of Medical Officer.	*Premonitory Diarrhœa.*	*General Symptoms.*	*Consecutive Fever.*	*Contagious or not?*
29. Mac Laine....	none	usual symptoms no blue colour	none	no mention of contagion
30. Connell.....	none	usual symptoms no blue colour	none	unable to give decided opinion, inclines to contingent contagion.
31. Bucke	none	usual symptoms no blue colour	none	no mention of contagion
32. Stain.....	none	usual symptoms no blue colour	none	thinks the disease communicable
33. Currie	diarrhœa in some native soldiers cured without the supervention of cholera	some of the cases had no purging, but constipation	none	epidemic
34. J. Duncan....	no diarrhœa	few or no spasms	none	epidemic broke out on the same day that the North-East monsoon set in
35. Conran.....	no diarrhœa	no cramps or spasms	none	no mention of contagion
36. Goldie	none	usual symptoms	none	decided anti-contagionist
37. M'Lean.....	none	usual symptoms	none	no mention of contagion
38. Cother.....	none	usual symptoms no blueness	none	no mention of contagion
39. Neilson..... (Aug. 1821.)	none	usual symptoms no blueness	none	no mention of contagion
40. Mitchell .... (1819)	none	usual symptoms no blueness	none	not contagious
41. Chalmers .... (1819.) (1820.)	none	usual symptoms the cattle were affected with a similar disease no blueness	none	not contagious travellers appear to carry with them an infectious atmosphere
42. England .... (1819.)	nausea, diarrhœa, headach, for some hours, and sometimes a whole day	usual symptoms no blueness	none	not contagious
43. Wyse ..... (1819.)	none	usual symptoms; fear a great cause no blue colour	none	epidemic

Name of Medical Officer.	*Premonitory Diarrhœa.*	*General Symptoms.*	*Consecutive Fever.*	*Contagious or not?*
44. Mather..... (1819.)	none	usual symptoms no blue colour	none	no mention of contagion
45. Wight ..... (1822.)	none	usual symptoms no blueness	dysentery in several cases	epidemic thinks it may be slightly contagious
46. R. Wight	none	usual symptoms livid face, and livor of dead body	none	a malignant epidemic
47. Turnbull .... (1822.)	none	usual symptoms no blueness	none	no mention of contagion
48. Donaldson ... (1822.)	none	usual symptoms	none	attributes the disease to various causes, moral and physical. Does not mention contagion
49. R. H. England (1821.)	diarrhœa of some hours, pyrexia	usual symptoms livid appearance	inflammation of brain stomach and bowels sometimes succeeds	assimilates cholera with yellow fever, plague, and typhus, and consequently considers it so far contagious
50. Chapman .... (1821.)	none	usual symptoms no blueness	none	poison in the atmosphere, contagious, afterwards says it is endemic
51. Provan ..... (1819.)	none	usual symptoms no blueness	none	inclined to contagion
52. Ewart ..... (1820.)	none	usual symptoms few spasms no blueness	none	cannot divine the cause
53. Williams .... (1820.)	none	skin warmer than usual	none	no opinion
54. Fasken.....	none	usual symptoms	some cases of dysentery and hepatitis	non-contagious
56. Barton ..... (1821.)	none	usual symptoms	debility and disordered bowels	not contagious
57. Stokes	none; bowel complaints prevailed previously to the breaking out of cholera	usual symptoms three degrees or grades no blueness	visceral affections, "dropsy and some slight fevers."	seemed sometimes to be communicable

Name of Medical Officer.	*Premonitory Diarrhœa.*	*General Symptoms.*	*Consecutive Fever.*	*Contagious or not?*
58. A. Campbell.. (1820.)	none mentioned	usual symptoms	diarrhœa	atmospheric
59. Pollock..... (1821.)	no diarrhœa	circulation not affected	none	"some extensive cause."
60. Job ..... (1821.)	none	bilious evacuations few died	none	no cause assigned
61. Cruickshank.. (1821.)	none	usual symptoms	none	thinks it infectious, but that its laws are extremely dissimilar to those of other *contagions*
62. Alexander.... (1821.)	none	usual symptoms	none	no opinion
63. Patterson .... (1822.)	none	usual symptoms	none	atmospheric and contagious
64. Dr. W. Pollock (1822.)	none	many of the worst cases had neither vomiting, purging, or spasms	none	a peculiar morbid poison unknown
65. Cowan ..... (1823.)	no premonitory symptoms	usual symptoms purple colour. All other diseases disappeared during cholera	none	no opinion given

SUMMARY.

1 Suspects it to be contagious.
1 Doubtful.
1 Contingent contagion.
1 Endemic and contagious.
1 Slightly contagious.
1 Inclined to think it contagious.
1 Sometimes communicable

1 Decidedly contagious.
2 Infectious.

10

13 Decidedly not contagious.

42 make no allusion to contagion. Of these 42, the great majority speak of the disease as an epidemic arising from some *atmospheric or terrestrial* cause; and, as the queries of the Madras Board particularly directed the attention of medical officers to the subject of contagion, we may fairly conclude that, where no allusion to contagion is made, no proofs of it presented themselves to the observers. Mr. Scot, the Secretary of the Madras Medical Board, sums up the opinions of the contagionists and anti-contagionists, and gives no opinion himself on either side.

Without anticipating the decision of the Bengal Board, we may be permitted to extract the following pithy sentence.

"This is the sum-total of the proofs in favour of the contagious nature of the disease in this quarter. *But, in fact, it amounts to nothing.*" BENGAL REP. p. 147.

The above tabular analysis of the data on which the Madras Board has founded its Report, has cost us much labour, and we have executed this task with impartiality and honesty.

The balance in favour of or against contagion, we leave to our readers, and we shall make no remark on that part of the subject, since the deter-

mination of this point ought surely to be left to the evidence of our own senses in this country, where the disease now exists. The summary at the end speaks for itself.

P.S.—*July*, 1841. The foregoing tables and observations were drawn up for the 5th edition, when the disease invaded the British metropolis. The author had at least as much experience of the epidemic in London as any one practitioner here. Independently of this, he formed one of a committee, composed of gentlemen of all grades of faith and scepticism, who investigated the complaint in all parts of the town, from Deptford to Chelsea, and from Camberwell to Islington. Not one single instance of unequivocal contagion, or of any thing approaching to it, presented itself to the committee or to the author, throughout the whole course of the epidemic. The idea is completely scouted throughout the whole of the British Isles. The sanatory boards of health, the anile edicts of cholera-phobic colleges having vanished into thin air, so did the dread of cholera!! We were triumphantly told that cholera having once invaded our shores, its annual visitations would be as regular as those of small-pox. Yet many years have now elapsed without any visitation of the most remarkable and wide-spread epidemic that the four quarters of the globe ever witnessed. The cholera-phobists are now as silent as the tenants of the sepulchre.

"Oh no! They never name it."

TREATMENT.

On this head little need be said. The following conclusions are those to which our Bengal brethren came:—

"1. The disease sometimes attacked with such extreme violence, as from the commencement, apparently to place the sufferer beyond the reach of medical aid, and to render every curative means employed equally unavailing.

2. The difference in the degree of mortality amongst those, who did, and those who did not take medicine, was such, as to leave no doubt, that, when administered in time, and with discrimination, it frequently saved the patient from death.

3. The chances of a patient's receiving benefit from medicine, diminished in proportion with the increased duration of the attack.

4. In Europeans generally, and in robust Natives, bleeding could commonly be practised, where the patient was seen within one, two, or perhaps three hours from the beginning of the attack: and in all cases, in which it was resorted to, under such favourable circumstances, it was more successful than any other remedy, in cutting short the disease: usually resolving spasm; allaying the irritability of the stomach

and bowels; and removing the universal depression under which the system laboured.

5. Amongst the generality of Natives, the depressing influence of the disease was so powerful, and rapid in its operation, as almost immediately to produce complete collapse, and nearly destroy arterial action: and, therefore, to render venesection, for the most part, from the beginning, impracticable.

6. In such cases the cure was best attempted by diluents, powerful anodynes, and stimulants; combined with calomel; and followed up by mild laxatives, and tonics.

7. Although it cannot be affirmed, that calomel possessed any specific power in checking the disorder, it was undoubtedly frequently useful in soothing irritability; and was, perhaps, of more certain sedative operation than any other medicine." 247.

The remedies which have been recommended—tried—and failed, in this terrible disease, since its ravages in these Islands, would occupy a volume, and, after all, would not be worth a groat! The fact appears to me that, after the collapse has taken place, medicine has little effect. From an attentive observation of cholera, as it appeared in England, I am perfectly satisfied that the disease is a *serous hæmorrhage* from the bowels—that is, that the serous part of the blood is drained off from the internal surface of the intestinal canal, till the powers of life are worn out, or the remaining blood becomes too thick to circulate. This is the only view of the disease that can account for the greater number of the symptoms, and the fatality of the malady. Men die of cholera precisely in the same way as from hæmorrhage—shrinking, paleness, and *coldness,* of all external parts—even of the *breath*—with spasms, the invariable attendant on severe hæmorrhage. If this serous hæmorrhage does not go to an irremediable extent, nutriment is converted into blood—and recovery—from the state of collapse, takes place—too generally to end in a dangerous consecutive fever. The treatment of this fever differs not from that of other low and malignant fevers. In the collapse, there is little to be done but exhibit light nourishment in small quantities at a time. It is in the stage of premonitory diarrhœa, that almost every thing is to be expected from proper treatment. I have hardly ever failed to arrest the disease in this stage, and before too much of the serous portion of the blood had been drained off. The treatment is simple. Rigid confinement to the horizontal posture—nothing but farinaceous food, with spices—and small doses of opium, with chalk-mixture after every relaxed motion. On this plan I have prevented cholera from taking on its dangerous stages, in hundreds of cases, during the late epidemic.

I have seen very little benefit from the farrago of medicines that have been prescribed for cholera in the collapse. The patient is in a far worse state than in common hæmorrhage: because, in the latter case, what blood

remains is good and fit to circulate. In cholera, on the other hand, it is like tar. Hence the cravings of the patient for *cold drink*, which ought to be allowed ad libitum, and is infinitely better than the burning stimulants that have been given, and which too often aggravate the disease! I have often thought that some of the benefit derived from copious draughts of cold water might be attributable to its checking the serous hæmorrhage into the stomach and bowels.

In respect to the treatment by calomel and opium, it is perhaps the best —or at least, *not the worst*, that has been employed. I have seen little benefit from the warm bath. The exertion of getting in and out of the bath generally increases the internal serous hæmorrhage. Frictions with hot flannels, to allay spasms, and restore heat, may be useful.

The consecutive fever, as might be expected, is violent in proportion to the previous collapse. It is almost invariably connected with local inflammation of some organ—chiefly the mucous membrane of the stomach, and bowels, or the meninges of the brain. Hence the necessity of watching the symptoms and checking the inflammation by leeches and blisters. Salines, with minute doses of calomel and James's powder, prove the best internal remedies.

I omitted to allude to sanguineous injections into the veins, as very few of the cases where it was tried, recovered under my observation. The physiological effects, however, of this transfusion are most remarkable. I have seen men who had been lying pulseless and cold as death for hours, revive under transfusion, with good pulse, warmth, and red colour of the lips; but, alas! they all died of the consecutive fever—generally with inflammation of the brain. Still, there are many cases on record, where final recovery took place after transfusion, and, in desperate cases, it certainly merits a trial.

J. J.

XXVII.—Remarks on Epidemic Cholera.

PREFATORY OBSERVATIONS.

I know no branch of medical inquiry more interesting than the history of epidemics, or one, an accurate observance of which, would prove more useful to physicians in whatever climate. How true it was, as declared by Sydenham, (and it unhappily continues so to this day), that no one has treated this great question "in proportion to the dignity of the subject."

A history of our local epidemics would be of great value, as enabling us to trace their connexion with changes of climate and condition of the surrounding localities, or with the social condition of the people, both European and native: had such a history existed, it would have helped to an earlier establishment of general principles, and a rational plan of treating our fevers especially; for, though all the epidemics within my personal recollection (and there is scarcely a year we have not one in some form) differ greatly from the ordinary endemics of the country, still, there will be found in most of them, so much of the savour of the soil, if I may be allowed the expression, as to render a knowledge of their history and treatment an object of no mean importance.

It is these sweeping epidemics, aggravated by endemial and social influences, that swell out our bills of mortality, and that did so in former times especially, to such a frightful extent.

Under a system of local improvement calculated to diminish the endemic sources of disease, I am satisfied that the value of European life in this city could be greatly enhanced.

From what is here said, however, it must not be supposed that we are without help in the case of epidemics, or that our means of prevention apply only to such diseases as are peculiar to the climate: far otherwise is the fact. Even epidemics are greatly modified by states of locality; and, as stated in another place, *they are found to fasten with peculiar severity, and remain longest, in such localities as are neglected*:—in truth, endemics are very often the parent stock upon which epidemics are engrafted. Why is it we have not now, as formerly, those terrible epidemic fevers which swept off "800 Europeans, and 50,000 blacks"? The cause is obvious enough to the most ordinary understanding: it is the same that has banished the former malignant intermittents of our City, to which we owe our present comparative exemption:—in short, when filth, want, and misery are removed, epidemics will have lost their chief power. The impure state of London during the 73 years from 1592 to 1666 was such, that the average deaths in each year, from the plagues, amounted to about a fourth part of the whole population; or what would, for the present population, amount to the fearful sum of 375,000 persons per annum!

Owing to the modern improvements of London again, only one person died of cholera out of 250 inhabitants, or little more than six thousand in the worst year of cholera,—the severest plague which has visited London since 1666.

In the absence of any formal record of our epidemics, I shall here insert, in the order of dates, a brief sketch of such as have occurred in Calcutta within my personal recollection.

CHOLERA.

It is impossible to say any thing satisfactory on a disease, which would seem every year to become a source of greater difficulty to medicine. In the stage of collapse it has too often proved to physicians what traumatic tetanus is to surgeons;—a disease, according to Hennen, which once fully formed, tended more to shew him what he could not trust to, than what he could place the smallest reliance on. My notices of cholera then, will comprise merely such desultory observations respecting the local history of the disease and its treatment, as my personal experience in various parts of India and Ava enables me to offer; for as to its remote cause, little or nothing is known. Like the pestilences of the fifth century before the Christian Era,* this epidemic has in a manner travelled up and down over the habitable world; returning often to the same place after a certain interval; pausing sometimes in its fury and appearing to sleep, but again breaking out on some point or other within its range, till, at the end of its appointed period, it disappears—I fear we cannot yet say—altogether. The first impression of the morbific causes would appear to be made on the system of organic nerves and their functions; for almost immediately, we have the vital actions of circulation, respiration, the generation of heat, and secretion, conspicuously disordered; and that, probably, through some unknown changes in the electric condition of the atmosphere.

When first I entered on military practice, in 1818, the disease had some marked points of difference in character, and in the means used to combat them, from those of more recent visitations of the epidemic. Formerly, simple venous congestion (of the most aggravated nature to be sure) seemed to form the more essential feature in the disease; and the spasm, which was of a chlonic character, could be referred to the oppression of the nervous energy following on concentrated cerebral and spinal congestion. It is on the supposition of the condition stated forming the leading feature of the disease in former times, and of the organic nervous function being less involved, that I would account for the efficacy of bloodletting then; for latterly, there seems a depression of the vital actions, which has greatly

* Described in Dr. Arnold's History of Rome.

embarrassed our treatment, and deprived us altogether of the former great resource, general bloodletting.

The first man I treated was a stout young soldier of Her Majesty's 59th Regt. in Fort William. There was incessant vomiting and purging, with spasms so violent that it required four men to hold him in his cot. I bled him profusely, and in a few hours he recovered. What a simple matter did the treatment of cholera then appear to my sanguine and youthful inexperience, and in how few years had I to think and act differently! The efficacy of bloodletting, even on the approach of collapse, was great and remarkable, and we practised it as if instructed by the great physician of congestive disease—Dr. Robert Jackson. Another case in point, out of many that I could relate, occurred to me in 1822, in the Governor General's Body Guard:—on visiting my hospital in the morning, the European Farrier-Major was reported to be dying of cholera:—I found that, during the night, he had been drained of all the fluid portion of his blood:—his appearance was surprisingly altered; his respiration was oppressed, the countenance sunk and livid, the circulation flagging in the extremities. I opened a vein in each arm; but it was long ere I could obtain anything but a trickling of dark treacly matter: at length the blood flowed, and by degrees its darkness was exchanged for more of the hue of nature. The farrier was not of robust habit, but I bled him largely; when he, whom but a moment before I thought a dying man, stood up, and exclaimed, "*Sir, you have made a new man of me.*" He is still alive and well.

How surprising to find that a few years more, and the same treatment would, within the same time, have proved as certainly fatal. To appearance, we have the same symptoms, in the same order; but these signs are fallacious; and the treatment which proved most successful if used early in the disease, during 1818-22, no man will now dare to put in practice. Why is this?—Is it that in the more recent visitations of the epidemic, we have, from its very onset, a greater depression of the organic nervous function than was observable during its earlier history? I think so; and that such aggravated depression constitutes the chief, if not the entire difference now-a-days.

Mr. Twining, would seem to think that virulence, on the first visitation, is peculiar to cholera, whereas in this particular, it differs not from the character of all acute epidemics;* and it was not the first brush that caused

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* An inadvertence to, or non-acquaintance with the rise, progress, and decline of epidemics, has led to great mistakes in medicine; for thus many measures of cure have been trumpeted forth as infallible, which in truth owed their efficacy to the circumstances that the epidemic was on its decline, and the latter cases of it were therefore disposed to spontaneous recovery. In yellow fever and cholera in particular, I have no doubt that the circumstances here stated have proved sources of great error. When therefore we hear of wonderful cures, we should carefully ascertain whether they have been performed at the *beginning* or *termination* of an epidemic season.

the mortality he speaks of in 1827, so much as the utter neglect of every precautionary measure usual on landing fresh troops in tropical climates. After what I have said at the commencement of this note, I shall not be suspected of boasting our success; but the circumstances oblige me to say that a neglect of all internal discipline, and not the violence of epidemic seizure, caused the excessive mortality of the young soldiers spoken of. The consequences were what might be expected from their characteristic heedlessness and ignorance: they frequently lay on the cold flags violently ill during the whole night, and were sent only to die in hospital in the morning. These facts are personally known to me as the colleague of Mr. Twining on the occasion he refers to. No wonder that Sir John Moore should attach so much importance to "interior discipline and economy in regiments." Here we had an example of the effects of want of both; and wretched must ever be the condition of the troops where such is the case: not all the skill or numbers of the medical profession can compensate for the absence of those rules of discipline which lead to rigorous preventive measures, and the speedy detection and treatment of disease.

Since the first outbreak of the epidemic in Bengal, it has spread westward, and over the nations of Europe and of America; yet, on a careful review of its history in all these countries, it does not appear that any additions whatever have been made, either to the Indian pathology or treatment of cholera. I do not make this assertion in disparagement; far from it, but to shew the great difficulties of these questions.

Of the pathological state, which actually constitutes the disease, we shall probably never know much.

There is, in rapidly fatal cases, a great exhaustion of the power of generating heat; the air expired from the lungs becomes progressively colder; and so do all parts of the body, until they are merged in that of death; but these and the other destroying states already mentioned leave no traces behind.

In protracted cases again, congestions, and even inflammations of various organs are frequently discernible after death; but these form only consecutive, or superadded events in the morbid chain, like the final oppression of the cerebral system of nerves, which occasionally become obtunded through the stagnation of the circulation, and consequent want of red blood. In the last stage of acute seizures, however, it is surprising how some retain their mental integrity to within a few minutes of dissolution, while others are for hours narcotized by the disease.

Here, as in all epidemics, it may be laid down as certain, that whatever tends to disturb the balance of health may lead to an attack of the prevailing disease. Hence, it is to the observance of preventive rules that communities will always owe most.

The avoidance of day and night exposure, and, in short, all those rules applicable to ordinary prevention, should here be rigorously attended to.

The diet at such seasons should be nutritious, dry, moderately stimulant, and easy of digestion. I have known several instances wherein the use of the shell and sable fishes of this river have led to an attack of cholera, apparently through their difficulty of being well digested. Cold acescent fruits and vegetables ought likewise to be avoided. An empty state of the vessels, hunger, thirst, fatigue and debility, give rise to activity in the process of absorption; and this would appear to explain how persons enfeebled by debauchery and loss of natural rest are more liable to be affected by diseases, whether epidemic or contagious. It is thus also that fear would seem to act. Another caution applies to the use of purgatives, and especially those of a cold saline nature:—Many instances have occurred within my recollection of the disease being thus insinuated and mistaken for the action of salts, until the speedy approach of the stage of collapse made the real nature of the case but too apparent. When purgatives must be used in such seasons, they should be of a warm aromatic nature; *and it ought to be a fixed rule never to exhibit them over night—that being the ordinary time of invasion.* It must not be forgotten too, that fevers, and bowel complaints especially, are very apt, under the epidemic influence, to merge in cholera, and that great care must therefore be observed both in the measure and the time for using the stronger means—bloodletting and purgatives.

Mental depression and a confident hope have their corresponding effects on the physical condition in a manner the most remarkable; and if the most undaunted resolution could avail in warding off such an enemy, I have seen instances wherein it was not wanting, and others in which it even appeared, after seizure, through the absence of all remedial means at the time, to have exerted a wonderful power of restoration:—they were the cases of officers on the march to Ava, during the Burmese war; and certainly, the *tonic power of hope*, and a high moral courage, never appeared to me so influential as in the cases alluded to. On the other hand, I know no disease in which the influence of the depressing passions is so fatal as in cholera. Soon after my arrival in Bengal, I heard of the death of a staff officer in Fort William, of pure panic. He had mild and obscure symptoms of cholera, it is certain; but I had it from the first practitioner of the day that, but for the influence of terror, there was nothing in his case to occasion anxiety: the fear of Cholera, and not the disease, killed him.

Confidence, as I have said, is both conservative and restorative; and as an instance of the former power I may mention that, at the time here spoken of, 1818, I had charge of a large detachment of Her Majesty's 67th Regiment, in Fort William, consisting of invalids, women and children—a class of persons but ill calculated to resist the violence of attack. Cholera raked the barracks occupied by these unfortunate people; and, for about a fortnight, I was all night administering to the sick, and removing them to hospital. During that time I was carried out thrice, quite faint, and with

the prevailing symptoms strongly marked; yet it so happened that the notion of being seized never once entered my mind; and thus, I believe, I escaped on each occasion, even without the aid of medicine. I may mention, on the authority of the statistical reports, as a very remarkable instance of the influence of hope in repelling disease, that during the epidemic yellow fever at Up-Park Camp, Jamaica, among the 91st Regiment in 1822, when the order was issued for their removal to another station, the fever ceased, and *though the corps was unexpectedly detained for three or four days after the order was issued, not one case was admitted into hospital in the whole course of that period.*

Details of medical management can have no place in a work of this description; but this much must be evident—viz. that in a disease, acute beyond all others, treatment to be successful ought to be applied at the onset: life may then be saved in a very large proportion; but, if unhappily the first few hours are lost, it too often follows that unavailing regrets take the place of hope, and that the best efforts of the physician are set at nought.

I have stated that the plan by copious bloodletting, followed by full doses of calomel and opium, was that found most successful on my arrival in the country, in resisting the onset of the disease; and when re-action took place, topical bleeding, was used to relieve local affections, and repeated mercurial purgatives completed the cure.

When, however, no such happy condition was present, but the opposite one of collapse of all the vital powers occurred, we were then, as now, very much wanting in available resource, notwithstanding the free use of every mode of stimulation.

It is very true that we occasionally see surprising instances of recovery from apparently hopeless sinking of the nervous and vascular energies; but candour will oblige all men to avow that, though such cases are saved by the assiduous exhibition of stimuli, yet it is equally true that the majority of them die now, as they did in our earlier experience; and I repeat that our European and Transatlantic brethren have not helped us through any of our difficulties in the management of this stage of the disease.

A full dose of calomel with opium will save life in a large majority of cases if used early;—and this fact ought to prove a great encouragement to all who will think on the subject as it deserves.

It will be seen then, that excepting the bloodletting, which we have been obliged latterly to abandon as deadly, our practice remains very much the same as it was at the commencement of the disease in 1817;—that is, the stimulating plan of treatment, with large doses of calomel, as originally recommended by Dr. Johnson, seems to have now become the general one in all countries. The natives who do not bear the depletory plan, have always appeared to me more susceptible of cure in the stage of collapse than Europeans, probably from being comparatively unused to stimuli. In

the army, and at the Native Hospital, I have often seen persons in whom nothing seemed to live but the respiratory apparatus; and yet, under the unceasing exhibition of ammonia—*always a safe stimulus*—they recovered in a proportion that often excited my surprise. To vivify the blood and arouse the power of generating heat, I made an European patient inhale pure oxygen. The effect for half an hour was extraordinarily promising; but, from want of proper apparatus, I was unable to continue the experiment: this was in 1827, in the Presidency General Hospital. The experiment has not been more successful in other countries.

In the Calcutta General Hospital, out of 803 Europeans treated in twelve years, there died 372; and in the Madras Presidency, taking a mean of four years, there died of Europeans, 23 per cent. and 45 per cent. of the native troops.

In England, 38·5 of the patients died; in Prussia 58·6; in France 100, 1000 persons died of Cholera, out of a population of 32,560,934.

To illustrate further the geography of cholera, the following table was prepared by order of Major Tulloch. It is interesting chiefly as marking a general uniformity in the results of treatment, excepting at the Mauritius, where the causes of the difference in result require explanation.

STATIONS.	Period of Observation	Aggregate Strength.	Epidemic Cholera.		
			Admitted.	Died.	Proportion of deaths to Admissions.
Windward and Leeward Command	1817—36	86661	none	none	none
Jamaica	1817—36	51567	none	none	none
United Kingdom (Dragoon Gds & Dragoons)	1830—36	44611	171	54	1 in $3\frac{1}{6}$
Gibraltar	1818—36	60269	459	131	1 in $3\frac{1}{2}$
Malta	1817—36	40826	none	none	none
Ionian Islands	1817—36	70293	none	none	none
Bermuda & Newfoundland	1817—36	11721	none	none	none
Nova Scotia and New Brunswick	1817—36	16442	210	59	1 in $3\frac{1}{4}$
Canada	1817—36	64280	256	127	1 in $2\frac{8}{10}$
Western Africa	1819—36	1843	none	none	none
St. Helena	1818—36	5908	none	none	none
Cape of Good Hope (Cape District)	1818—36	22714	none	none	none
Cape of Good Hope (Eastern Frontier)	1822—34	6630	none	none	none
Mauritius	1818—36	30515	268	32	1 in $8\frac{1}{3}$
Ceylon	1817—36	42978	788	257	1 in $3\frac{1}{6}$
Madras	12 years	127925	3510	974	1 in $3\frac{6}{10}$

In England, half the deaths occurred in the first 24 hours, shewing the urgent necessity of early treatment in this disease; for, what is to be done must be on the instant. In the epidemic visitation of 1838 in Calcutta, the deaths that I witnessed took place from two to twelve hours from my first seeing the sufferers. Here there was time—every thing in cholera—irrevocably lost.

It is worthy of notice, as marking the influence of the epidemic condition on the lower animals, that two horses died in March 1838 of vomiting—a most unusual symptom with this animal; and a third, belonging to Mr. W. H. Frith, vomited large quantities of serous fluid, sweating profusely at the same time. This was communicated to me by note from Mr. Frith.

To conclude;—I subjoin two tables exhibiting the influence of season on mortality from cholera:—

Table of Deaths by Cholera amongst the Native Inhabitants of Calcutta for 7 Years, from 1832 *to* 1838 *inclusive.*

	Hindoos.	Mussulmans.	Total.
In 7 Januarys.....	572	124	696
„ 7 Februarys	620	196	816
„ 7 Marchs	1873	439	2312
„ 7 Aprils.....	2707	482	3189
„ 7 Mays	2170	464	2634
„ 7 Junes	615	217	832
„ 7 Julys	914	133	1047
„ 7 Augusts	806	146	952
„ 7 Septembers	785	121	906
„ 7 Octobers	1030	198	1228
„ 7 Novembers	1687	230	1917
„ 7 Decembers	1425	161	1586
Total.....	15204	2911	18115

The Table from which the above has been framed, is interesting on several accounts, but especially as shewing that, while the proportion between the Hindoo and Mahomedan population is but as $2\frac{1}{2}$ to 1, the ratio of mortality amongst the Hindoos is, to the better fed and better clothed Mahomedans, as $5\frac{1}{5}$ to 1.

The following Table exhibits the totals of Admissions and Deaths of Europeans from Cholera in each month during 12 years, within the Presidency General Hospital:—

Range of Observation.	Total Admissions.	Total Deaths.
In 12 Januarys	28	11
,, 12 Februarys	8	5
,, 12 Marchs	56	34
,, 12 Aprils.....	86	57
,, 12 Mays	268	125
,, 12 Junes.....	138	38
,, 12 Julys	32	6
,, 12 Augusts	37	18
,, 12 Septembers	10	5
,, 12 Octobers.....	49	27
,, 12 Novembers.....	59	32
,, 12 Decembers.....	32	14
Grand Total....	803	372

J. R. M.

XXVIII.—Delirium Tremens.

The importance and interest attaching to this disease will be rendered apparent by reference to the table at the end of this article, and with which I have been favoured by Major Tulloch. Delirium tremens is important too, as forming a very frequent complication with many of the acute diseases of Tropical climates—a fact not sufficiently noticed by authors.

In the soldier, habituated to the use of ardent spirits, it is a frequent complication, and so it will be found varying in degree, in persons of better condition, who indulge freely in wine, malt and fermented liquors, and in the use of tobacco. After the vigorous use of depletory means for the removal of fever, dysentery and hepatitis, how often do we see the latent delirium tremens unmasked in all its real and illusory horrors;*—in other words, where febrile or inflammatory symptoms have yielded to the free use of bloodletting, purgatives, &c. how often do we see the patient become low, agitated, desponding, tremulous, and sleepless—symptoms which, if disregarded, become sources of aggravated suffering and danger in the sequel;—in short, life may be sacrificed if the condition here spoken of is mistaken for and treated as cerebral inflammation. It is here then, when by the means indicated, room has been given for the display of nervous irritability, or exhaustion, that opium becomes really useful in tropical dis-

* Delirium tremens is always designated by the European soldiers in Bengal—"*the horrors.*"

ease; and many a physician has found anodynes of advantage, under such circumstances, without having been able to assign the reason.

There is in Bengal a very general disinclination, almost amounting to prejudice, from the use of opium in acute disease, owing to its tendency to lock up the secretions, and to mask the symptoms; but I have often exhibited this drug in small doses with marked advantage, when I found a tremulous lowness, agitation, and anxiety, or else the true delirium tremens emerging from under the graver symptoms of other acute diseases, and after these latter had given way to bloodletting and the other means in general use. Opium then quiets nervous agitation, and procures sleep; but its use requires discrimination: if exhibited *before* the removal of inflammatory or febrile states, it is apt, in the words of Dr. Robert Jackson, "to disguise the circumstances of the case."

Having offered these prefatory observations, I proceed to state that, in India, delirium tremens appears in forms more or less acute and complicated as the disease may occur in the seasoned or the newly-arrived soldier. In the cases of the young soldiers, we find that occasional courses of drinking, with insolation, will produce great excitement of both nervous and vascular functions, amounting in some cases to maniacal fury, the strangest illusions, violence and hurry of manner, with incessant muttering and general irritability, the face being flushed, and the head hot. There is great anxiety, with oppression at the præcordia, vomiting, spasmodic pains, and occasional headache, the urinary and intestinal excretions being scanty and depraved, the tongue foul and tremulous. While this earlier stage continues, the skin is harsh and dry; but if it be protracted, symptoms of exhausted nervous and vascular energies take place of the previous excitement.

Mr. Playfair of Bengal describes a patient as insisting on being discharged the hospital, for that the guard had conspired against his life; or, he sees his comrades attempting to shoot him through the windows. He then collects his bed, and everything he can find, and piles them against the door, to guard against the supposed attack, crying aloud for justice or revenge. With the strength and fury of a madman, he then throws every thing about the room; or, he may seat himself in a corner, with eyes fixed on vacancy, listening to and conversing with imaginary beings. In this latter state, he will injure no one; indeed such is not his desire, though there is generally some one against whom he complains: like madmen too, *personal fear* predominates. The patient often calms on finding himself under the restraint of the strait-waistcoat, and begins to relate his grievances; and then only can be prevailed on to take medicine. At other times, restraint seems only to increase the fury of the patient, who foams at the mouth with rage, blaspheming in the most horrible manner.

A patient supposed himself a messenger sent from Heaven to save the souls of those who sought his protection, and pointed to the heavenly hosts on the wall, with "the devil looking round the corner, afraid to advance:"

another imagines himself charged with the most unnatural crimes, and asserts his innocence in the most pathetic manner; while a third believes himself condemned to be shot for a crime he never committed; but though he was to suffer innocently, he called for instant execution, and placing himself against the wall, begged that a file of men might be ordered to despatch him: a fourth complained that his wife's honour was in danger from the designs of villains; and, lifting up the corner of the quilt, pointed to Mr. Playfair the place of her imagined concealment.

A soldier of the Bengal Artillery is mentioned by Dr. Spry, who required six men to secure him in the strait-jacket. He stripped himself naked, and in the night, burst from the hospital to the adjoining dead-house, barricading the door with tables on which the bodies of four deceased comrades were lying. Here an appalling scene presented itself; the raving drunkard being in close conflict with the dead, uttering at the same time the most dreadful imprecations that language can afford. Such are some of the effects of spirit drinking on the young soldier.

In the old soldier again, habituated to the abuse of intoxicating liquors, every debilitating cause, frequently even the withdrawal of the accustomed bane, is followed by collapse of the vital powers, as indicated by nervous depression—excessive gastric irritation—a feeble and frequent pulse—cold and clammy skin—a hurried and imperfect respiration. The manner, though wild, is more subdued, and the temper melancholy, the mind being in a perpetual anguish, continually haunted with imaginary alarms and illusions; but, when the attention is aroused by a question, the answer is rational.

The wretched sufferer, deprived of half his reason, is yet miserably conscious of his condition;—in short, the moral and physical ills produced by habitual inebriety are here concentrated. After a time, sleep is entirely banished, with aggravation of all the symptoms, until at length, as the disease advances and the energies sink, a complete exhaustion of the powers of life announces the immediate approach of danger. I have seen men walking about in this phrenzied condition, whose death took place within a few minutes instantaneously, and as if struck by lightning; while, in others, death was preceded by aggravated tremor, ending in general convulsion.

If it be admitted that in young men, occasional drunkenness, with or without direct solar exposure, be the most frequent cause of the more acute forms of delirium tremens, there can be no doubt that a protracted residence in tropical climates, along with the habitual tippling and tobacco-smoking of the old soldiers, form together by far the most general, if not the only causes of the disease, in its other and more frequent examples. The truth of this is exhibited in the relative statistics of the navy and army; for, in the former, though delirium tremens is found to result from excessive debauch in harbour, it is neither of such frequent occurrence, nor so fatal in

its results, by many degrees, as in the army, and especially amongst such troops as are paid daily; for with these latter, in place of the drunken bout which followed the receipt of the month's pay, according to former custom, there is now a far more injurious course of excitement in the shape of a daily use of ardent spirit.

The appearances on dissection that have come under my observation (and they were instances of old soldiers) have shewn more of injury to the mucous digestive surface than to the cerebral organs; and in no instance, that I remember, could the examination of the brain merely demonstrate a sufficient cause of death. The patients appeared to die from an exhaustion of the nervous function, both organic and animal—a nervous apoplexy, which left no trace behind it. Though there is no direct evidence of the fact, it is yet difficult to escape the conviction that, by the continuous application of the cause, the very blood becomes depraved, so as to disorder all the functions of life, but especially those of the nervous system.

In the newly-arrived soldier, we must be on our guard against the approach of inflammation of the investing membranes of the brain, and mucous digestive surface—complications by no means uncommon in the young and plethoric. Here one general bloodletting, or else leeches to the epigastre and nape of the neck, sinapisms having first been applied to these parts, will be found necessary; immediately after which, a full dose of calomel, followed by a brisk cathartic, will prove of signal service: they are, indeed, necessary in themselves, and give efficiency to all other measures of cure. When by these means, with cold drinks, and cold applications to the head, vascular excitement has been subdued, and a free discharge obtained from the bowels, we must look carefully to the state of the nervous function, and secure sleep, for without that, there is no safety.

This is best effected by opium; and the dose must be such as to obtain the result; indeed, the best mode is by repeated doses, until perfect and prolonged sleep is secured. The recovery is then rapid.

In the old soldier, bloodletting is seldom required; on the contrary, we find that, owing to his length of residence within the tropics, and reduced powers—reduced too by previous attacks—stimulants are required in aid of opium. Here opium is the standard remedy, and it is quite surprising how much the patient will require in course of 24 hours, before his safety is secured by sleep: as in other disorders of the nervous system, however, the only measure is by the result; all else is but trifling. I remember the case of a woman in Calcutta, the wife of a serjeant of police, to whom I gave every four hours, a quantity of the liquor opii sedativus that would appear incredible. Her's was one of the severest cases I ever saw; yet she recovered rapidly, and without an uncomfortable feeling connected with the opiate treatment. It is but right here to state, however, that in proportion to the free operation of cholagogues, and to the benefits derived

from the other means stated, the less will be the quantity of opium required to complete the cure.

The diet in young soldiers I have always directed to be of the most sparing nature, *with iced water for common drink,* while the old and habitual tippler has required sago, with wine or brandy, proportioned to the degree of exhaustion.

The following table exhibits the relative prevalence and mortality from delirium tremens amongst the European troops of Her Majesty's army in the several Commands mentioned:—

Delirium Tremens.	Aggregate. Strength.	Admitted.	Died.	Proportion of deaths to admissions.
West Indies	86661	1426	175	1 in 8
Jamaica	51567	191	42	1 in 4½
Cape of Good Hope	22714	13	3	1 in 4⅓
Mauritius	30515	514	50	1 in 10¼
Ceylon	42978	35	7	1 in 5
Bermudas	11721	102	9	1 in 11
Nova Scotia and New Brunswick	46442	207	18	1 in 12
Upper and Lower Canada	64280	296	18	1 in 16
Gibraltar	60269	44	5	1 in 9
Malta	40826	38	5	1 in 8
Ionian Islands	70293	192	30	1 in 6½
United Kingdom	44611	27	4	1 in 6¾
Bengal, 1836 to 1840	36286	672	14	1 in 48
Madras, 1832 to 1836	31267	496	21	1 in 24
Bombay, 1836 to 1840	18073	113	15	1 in 7½
Tenasserim Provinces, 1836-37	7000	34	5	1 in 7

The above table suggests many inquiries, but which cannot be answered without entering into a variety of circumstances affecting the moral and physical condition of the soldier.

Why the mortality by delirium tremens in Madras should be double that of Bengal, for instance, and why that of Tenasserim and of Bombay should so very far exceed that of both the sister presidencies, are points of much interest. Again, so far as ordinary tropical influences are concerned, the colonies of the Cape of Good Hope, Mauritius, and the provinces of Tenasserim, enjoy a remarkable exemption, the deaths by fever, dysentery and hepatitis being few, as compared to the other British possessions; yet in these most favoured climates, delirium tremens proves most fatal.

Even within the British islands, we find that, though delirium tremens is comparatively a rare disease, the ratio of deaths to cases treated is nearly eight times as great as in the unhealthy countries under the Bengal Presidency.

J. R. M.

XXIX.—Beriberi.

The *Beriberi* is a disease of a peculiar nature, which has been extremely frequent, and fatal amongst all the troops, both *Europeans* and natives in Ceylon. In the milder cases of this disease, the patients are first attacked with some stiffness of the legs and thighs, and this is succeeded by numbness and œdema, sometimes paralysis of the lower extremities.

In the course of a few days, if not prevented by medicine, these symptoms are succeeded by swelling of the whole body, attended with a sense of fulness of the belly, and more particularly with weight and oppression at the præcordia; dyspnœa, starting in the sleep, and all the usual symptoms of hydrothorax. In the latter stage, the dyspnœa and anxiety become extreme, the uneasiness at the epigastrium increases, attended with almost constant vomiting, and occasionally spasms of different muscles; the pulse becomes very feeble, the lips and countenance livid, and the extremities cold.

Some fever, with delirium, often now accede, and terminate the life of the unfortunate sufferer. In the more sudden and severe instances, the patients, from the first, complain of universal debility and extreme oppression, anxiety and dyspnœa. In some of these instances, the progress of the disease is so rapid, that it carries off the patient in six, twelve, twenty-four, or thirty-six hours, after its first attack: more frequently, however, its duration is for several weeks.

In a few cases, where the disease was no less fatal, there was not any swelling observable externally; but the patient with the other symptoms, had evidently the bloated leucophlegmatic face of a dropsical person.

Upon dissection of different subjects, who had died of this disease, more or less water was found in one or all of the cavities of the chest; most commonly in the pericardium; but in general, more inconsiderable than might have been expected from the violence of the symptoms. The cellular substance surrounding the heart was, in some instances, loaded with water; and the heart seemed, in two or three cases, of an uncommon size. In one instance, in which the progress of the disease had been very rapid, I found a large coagulum of lymph in the right auricle. The cellular substance of the lungs was, in many cases, loaded with water. In a few cases, also, there was water effused in the cellular substance on the surface of the brain: and in one instance, more than an ounce of water was collected in the ventricles. In most cases, water was found in the abdomen and cellular membrane throughout the body; and, in many subjects, there was a remarkable obesity, even after a long continuance of the disease, and of the use of mercury, antimony, and

other powerful medicines. Men of every constitution are occasionally attacked with the *Beriberi*, but the aged and debauched seem to be the most liable to it; and men who have once had the complaint, are the most subject to it in future. I have remarked that a very great proportion of the patients, seized with this disease, were men who were accustomed to lead a sedentary and debauched life, such as tailors, shoemakers, &c. who, when working at their trade, are often excused the duty of the field, and, by their double earnings, are enabled to procure a larger quantity of spirits than the other men.

I have never met with an instance of this complaint in a woman, an officer, or a boy, under 20; although persons of every description seem equally liable to the other diseases of the place, such as fever, flux, or liver-complaint.

It would appear that a stay for some months on the station, is almost essential for the production of the disease: and that the greatest predisposition to it exists, when troops have been about eight or twelve months in the settlement.

The 72d Regiment and Coast Artillery landed here in July 1795. The *Beriberi* was with them most prevalent in the Autumn of 1796; but they had little of it in March 1797, when it was extremely frequent with the 1st battalion *European* infantry, who had arrived here in August 1796.

The 80th regiment relieved the 72d in March 1797, but suffered little from the disease till the November following. The Honourable Company's *Malay* corps arrived here, from *Jaffnapatnam*, in June 1797; but the complaint did not appear amongst them till the January following, when it became very frequent and fatal. Two hundred drafts joined the 80th at *Trincomalee*, on the 3d of January, 1798: but none of these men had the disease in January, February, or March, although it was then very frequent with the other men of the regiment: since that time, however, these drafts have been at least as subject to it as the other men.

Various modes of cure have been attempted in this disease: but I have of late uniformly pursued the following plan with uncommon success.

In the more mild cases, the patients are immediately put upon a course of calomel and squills. The perspiration and other evacuations are promoted by saline drinks, or small doses of antimonial, or James's powder; and the strength supported by cordial liquors, most generally gin punch, which assists much the effect of the squills.

By these medicines, the symptoms are very often removed in the course of a few days; except the numbness of the extremities, which generally remain longer than the rest. Pediluvium and stimulant liniments are then ordered to the extremities, and the patients are put upon a tonic plan, of bark and wine or porter, which is continued for some time after

all the symptoms have disappeared. In the more severe cases, where the dyspnœa, vomiting, spasms, or other symptoms are violent, it is necessary to apply blisters to the breast, to make use of fomentations, and the hot bath, and to exhibit the strongest cordials and antispasmodics, as brandy, and, particularly, laudanum and vitriolic æther. By these means I have, in most instances, been enabled to relieve the dyspnœa, and other urgent symptoms; and procure time for the exhibition of the medicines mentioned above, which it is sometimes necessary to use for several weeks. —*Christie's Report, &c.*

Observations on the Nature, Causes, and Treatment of Beriberi. By William Hamilton, Esq. Surgeon, H.E.I.C.S.

[ANALYSIS.]

The singular disease which forms the subject of Mr. Hamilton's communication, is principally, if not entirely, confined to the Island of Ceylon, the Malabar coast, and that tract of country stretching from Madras to Ganjam in length, and about forty miles in breadth. It is most prevalent during the decline of one monsoon and setting in of another, "when the atmosphere is completely loaded with cold, raw, damp vapours, and the vicissitudes of temperature are greater than at any other period of the year." It seldom occurs at a distance exceeding sixty miles from the sea. A residence of some months in the locality where the disease prevails, seems necessary to its production. There is no constitution exempted from an attack of Beriberi; but those who are sedentary, debauched, and much exposed to vicissitudes of weather, are most subject to the disease. One attack also leaves a predisposition to another. The old and infirm are more liable than the young and active.

Mr. Hamilton had an opportunity of seeing the complaint under two forms only, viz. that in which the symptoms were at first mild, and gradually increased in severity—and that in which the symptoms were, even from the first, rather urgent, increased rapidly, and, unless speedily relieved, proved fatal.

The two first cases which fell under Mr. Hamilton's care were treated on the plan recommended by Dr. Christie (calomel, squills, and other diuretics), but both terminated unfortunately. Mr. H. now examined the body of the second patient, and found an ounce of serum effused between the pia mater and tunica arachnoidea, with two or three dark red patches, exceedingly vascular, extending into the substance of the brain. There was also effusion into the ventricles, and at the base of the brain. The lungs were loaded with dark-coloured blood, and water was effused into both cavities of the chest. The heart was healthy, no effusion into the pericardium, but this bag exhibited marks of inflammation both internally

and externally. The liver was larger than natural, and appeared still more loaded than the lungs. On examining the spinal marrow, evident marks of congestion were found, particularly in the dorsal region. Three or four pints of effusion had taken place in the abdomen.

These post mortem appearances coincided a good deal with those published by Mr. Ridley, in the Dublin Hospital Reports, and determined Mr. Hamilton as to the nature of the disease. He became convinced that it arose, in a great measure, from obstructed circulation, in consequence of congestion in the internal parts, more especially the liver and lungs, and that Beriberi consequently could not be a mere disease of debility, as supposed by Colquhoun, Hunter, Christie, and others—but, on the other hand, that it was a disease, in the treatment of which, bloodletting might be used with the greatest prospect of advantage.

"The prevalence of the disease," (say Mr. H.) "during the change of the monsoons, may be accounted for, by the damp loaded state of atmosphere, and the extreme vicissitudes of temperature which, by suddenly checking perspiration and producing (to use the words of Dr. Johnson in his very excellent Essay on Cholera) 'unparalleled atony of the extreme vessels, debilitated by previous excess of action, break at once, and with violence, the balance of the circulation. The extreme vessels of the hepatic system sympathising with those on the surface, completely arrest the reflux of blood from the portal, cœliac, and mesenteric circles;' hence that gorged state of the internal parts, which appeared in the case I have related, and which, in a still more marked degree, is found to exist in the cholera of India." 21.

From these considerations, Mr. Hamilton resolved to employ venesection in the subsequent cases that fell under his care. He therefore abstracted 30 ounces of blood from the next patient, which gave immediate though temporary relief, and encouraged him to proceed to the abstraction of 35 ounces more, in the course of the next twelve hours, the dyspnœa and other symptoms having returned. Immediate recourse was now had to mercury, on which Mr. H. confidently relied, if he could bring the system under its influence. He accordingly directed 20 grains of calomel with 30 drops of laudanum, to be given, and a vapour bath to be applied. In an hour and ten minutes the calomel was repeated, with the laudanum, soon after which the patient fell into a sound sleep, and awoke in a copious perspiration. His pulse had now increased in strength, and the dyspnœa was not near so distressing. The calomel was repeated, with gamboge, and afterwards the calomel alone, in scruple doses, every three or four hours, until ptyalism was established, which required more than forty hours. Every unfavourable symptom now disappeared, and the patient complained only of soreness of mouth.

In another case, there was, from the first, violent and continued vomiting, which yielded, however, to large and repeated doses of calomel and

laudanum, with a strong and heated sinapism to the region of the stomach —a remedy which Mr. H. found singularly successful in speedily allaying the violent gastric irritability of bilious remittent fever and cholera, where calomel and laudanum had failed.

In one case, where the individual was of rather a full habit, bleeding was thrice employed, the patient losing, in all, more than 65 ounces of blood, within thirty hours—"and that with the happiest effects." This practice was adopted too, although the dropsical and other symptoms had existed for nearly two days before Mr. H. saw the patient. The quantity of blood to be drawn must, of course, be regulated by the symptoms in every particular case, as well as by the age and constitution of the individual.

Dr. C. Rogers, who practised for some time in Ceylon, has communicated to Mr. Hamilton the particulars of two cases treated by bloodletting, in which there was a striking alleviation of all the symptoms, as soon as blood was abstracted. With the following extract from Mr. Hamilton's paper, we may conclude this short notice.

"In cases where there exists irritability of the stomach, or bowels, or of both conjoined, as is very frequently the case in some of the diseases of India, or where my object is the speedy production of ptyalism, I never think of exhibiting calomel in smaller doses than from 15 to 20 grains—and in the propriety of this I am confirmed by the experience of others. In such doses it seems to act as a sedative, in so far as it allays vomiting, removes griping and spasm, and frequently procures for the patient sound sleep; while in smaller doses, as from four to seven and even ten grains, it operates as a purgative, often producing considerable griping, with sickness and a general sense of lassitude. Experience has likewise established the importance of this medicine being given in the form of powder instead of pills, particularly in cases where the bowels are much affected, as in dysentery or cholera morbus; for in such cases pills have been frequently known to pass off nearly as they had been given." 28.

One case is given in detail, but it is unnecessary to state any of the particulars in this place.

An Account of an Endemic Disease of Ceylon, entitled Berri Berri.

By J. Ridley, Esq.

[analysis.]

The term Berri Berri has been given to this fatal disease by the Malabar Physicians, signifying that waddling unsteady motion observed in sheep when walking, and which obtains in patients labouring under this disease. That restlessness, or panting for breath also, produced by the anxiety and distressing sensations then experienced, is expressed by the term Berri Berri.

Œdematous swellings of the legs and feet are among the first symptoms. The throat is frequently swollen with a sense of numbness round the mouth; indeed, a general sense of numbness prevails, especially of the inferior extremities, which are unusually weighty and rigid (hence the unsteady gait); with scanty, high-coloured, and acrid urine, ending, as the disease advances, in a total suppression of the secretion. A sensation of pain and tightness is felt immediately beneath the inferior edge of the sternum, which becomes so distressing as to induce the patient to solicit that the part may be cut open, under the hope of relief. The bowels are generally costive; the stomach irritable; the dyspnœa harassing, when moving quick, or ascending an eminence; inability to lie down. The skin is natural until the advanced stage, when it becomes cold and clammy. The pulse is sometimes regular, sometimes quick, hard, or intermitting.

The approaches to this disease appear to be gradual, the patient generally perceiving more or less swelling in the legs, attended with lassitude, languor, and some dyspnœa, for two or three days prior to his applying for medical aid.

The appearances on dissection are not always the same. There is, however, in all classes, effusion of water into some of the cavities of the head, chest, or abdomen, independently of the anasarcous effusion. The heart, in some cases, is enlarged, with hydro-pericardium. The cellular substance of the lungs was found loaded with water, in many cases, by Dr. Christie. Mr. Ridley found the viscera inflamed, in the majority of instances; the diaphragm particularly so, as also the urinary bladder.

According to Dr. Christie, men of every constitution are occasionally attacked with Berri Berri; though the aged and debauched are more predisposed to it than others. Those also who have once had the complaint are most subject to it in future. Dr. C. found tailors, shoe-makers, and other workmen, who lead sedentary lives, and spend much of their earnings in drink and debauchery, more frequently affected with this complaint than people of opposite characters.

The same intelligent physician informs us that he never met with an instance of the complaint in a woman, an officer, or a boy under twenty years of age. He also thinks, that a stay for some months on the station, is almost essential for the production of the disease; and that the greatest predisposition to it exists, when troops have been about eight or twelve months in the settlement.

Treatment.—Dr. Christie's plan of treatment was a course of calomel and squills, the perspiration and other secretions being promoted by diluents and antimonials, while the strength was supported by cordial liquors, as gin, punch, &c.

Mr. Ridley's plan was very simple: a purgative of calomel, jalap, and crystals of tartar, was first given; the legs and feet were bathed in warm

water, and afterwards well rubbed with camphor and oil of turpentine, or with mercurial liniment, and then rolled with a moderate degree of pressure, in flannel bandages. A pill, composed of one or two grains of calomel and two or three of powdered squills, is then given every two or three hours, and the solution of crystals of tartar as common drink, sometimes made into punch, with Arrack or Geneva. Under this treatment the disease is frequently removed in a few days. But when the complaint advances, it requires a more powerful practice, such as blisters to the back of the neck, and to the epigastrium; the warm bath; fomentations to the abdomen and lower extremities, followed by frictions of mercurial ointment, camphor, and oil of tupentine, while purgative glysters are to be thrown up, to allay the gastric irritability. When a paroxysm of vomiting or dyspnœa has been urgent, large doses of laudanum and brandy have been given with good effects; and in many desperate cases, these medicines have suspended those alarming symptoms, and time has been obtained for the employment of other remedies. Mr. R. administered a diuretic, composed of half an ounce of nitre and two ounces of distilled vinegar, and given in doses of half an ounce every three or four hours, with the best effects. Tinct. lyttæ was also employed with advantage. Gamboge was occasionally administered by Mr. Ridley, in small doses, either alone, or combined with the purgative powder.

It was found necessary, as a matter of HYGIENE, to have the men paraded twice a day, and then carefully examined, so that the disease might be detected in its primary movements. The natives were, by much persuasion, induced to sleep within doors, and drink a small quantity of Arrack, as a preventive of Berri Berri.

"Dissolution (says Mr. Ridley) took place generally in a sudden manner; very frequently while speaking to one man, I have been called to another, whom I had just left under promising circumstances, and have found him gasping, his eyes protruded, his hands clenched, and a few minutes have closed the scene. It has sometimes happened, that the man I was addressing has been taken off in the same manner."

Mr. Ridley, at length, became affected with the disease, and nearly fell a sacrifice to it. He recovered, however, by the plan of treatment already described.

The *Etiology* of Berri Berri is but imperfectly known. Bad water, unwholesome diet, and certain states of the atmosphere, are generally considered as the principal causes, particularly the hot land-winds.

XXX.—The Dracunculus, or Guinea Worm.

Although this worm attacks most parts of the body, it shews a preference to the lower extremities, particularly the feet and ankles, where it is painful and dangerous in proportion as the parts are thinly covered with flesh. It is difficult to extract it from the tarsus and metatarsus—sometimes impossible from the toes. The consequences are often tedious suppurations—contractions of the tendons—diseases of the joints—gangrene. When the worm is pulled, the pain is sometimes excruciating, as the animal would appear to attach itself to the nerves, ligaments, and tendons. The track of the worm seems to be in the cellular membrane, rarely deeper. There are seldom any premonitory symptoms. The presence of the disease is usually announced by itching, redness, and heat in the skin of the part, succeeded by a vesicle, with some swelling and inflammation. Under the vesicle, which contains a white, thick mucus, the head of the worm may be generally discovered; but sometimes not till several days after the ulceration. Occasionally a small ulcer is the first thing observed; at other times, tumor of the whole limb, with much inflammation. The worm sometimes appears like a hair, several inches long, and becomes thicker as it is extracted; but it generally has a sharp point, and is all of the same thickness. It may often be felt and traced by the fingers, like the string of a violin, under the skin, where it excites no very sensible uneasiness, till the skin is perforated by the animal.

When removed from the body it exhibits no appearance of life, even when extracted at one operation. In length, it varies from 18 inches to six feet. It is elastic, white, transparent, and contains a gelatinous substance.

When the disease is seated in parts that are tender—when there is extensive ulceration—or where the constitution is irritable, there is generally some fever, loss of appetite, debility, and evening exacerbation, especially if the worm happen to be drawn too tight. Swellings of the inguinal glands are sometimes sympathetically induced when the complaint is situated in the lower extremities.

Various have been the opinions respecting the generation of this insect. Both ancients and moderns have attributed its production to the drinking of putrid stagnant waters containing the ova of the worm. Some have regarded the worm as produced from ova deposited in the skin by insects. This last supposition is by far the most probable, notwithstanding the ingenious arguments brought forward by Dr. Chisholm, in favour of the aqueous generation, and for the following reasons:—1st. The disease most frequently attacks those parts of the body that are exposed to wet, as the feet and legs. Thus the Bheesties or water-carriers in India, who

carry the water in leather bags on their backs, are observed to be much afflicted with Guinea-worm in those parts that come in contact with the mushuk or bag.—2nd. It prevails in wet seasons and damp situations more than in dry.

Many causes, however, may contribute to the production of the disease, as confinement, heat, want of cleanliness in person and habitation, &c.; and the means of prevention are founded on these premises, viz. cleanliness —avoiding dampness—keeping the feet and legs covered (which few European soldiers and sailors attend to in tropical climates), bathing in the sea, in preference to lakes and rivers—and avoiding contact with those infected; for there is great reason to believe that the disease is propagated by contagion when once produced by other causes.

Methodus Medendi.—Mercury, carried to the length of impregnation of the system,* has been considered by some as a specific, and so has assafœtida, in Guinea-worm; but the local means are those most to be depended on. *Sublata causa, tollitur effectus.*

When an inflammatory tumor ushers in the disease, leeches, cataplasms, fomentations, and other antiphlogistic measures are to be pursued, till suppuration occurs, and the head of the worm becomes apparent. It should then be seized by the forceps, and pulled very gently and gradually until there be a little resistance, and the worm becomes moderately tight. The extraction is often facilitated by friction with warm oil, and well-adjusted pressure in the line of the worm towards the wound. When as much of the animal has been drawn out as the resistance and pain will admit, the end of it should be secured by a ligature or thread passed round it; the thread should then be tied to a piece of small bougie, twisted lint, or small quill, an inch and a half in length, and, with the slack part of the worm, is to be rolled up until it be moderately tight, taking care that it be not on the stretch, as it will occasion fever, or endanger the breaking of the worm. A piece of adhesive plaster is necessary to retain it in its place, and poultices may be continued, especially where there is tumor, to promote a discharge and the expulsion of the worm.

In general, the extraction should only be attempted once in the twenty-four hours. Sometimes a foot of worm can be extracted at once, sometimes not an inch. When the whole is drawn out, the sore may be treated as a common ulcer, making moderate pressure on the original track of the worm.

When by injudicious extraction the animal is broken, then tumor, fever, and tedious suppuration in that or other parts are the frequent consequences. Here recourse must again be had to fomentations and cata-

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* Vide Chisholm in Edin. Journal, vol. 11.

plasms, until the ruptured end of the worm can be again discovered, and laid hold of.

When the worm can be distinctly felt by the fingers under the skin, before breaking through, it is advisable to extract it by means of a small incision made over the part where it is most superficial, and, as near as possible, over its middle. A ligature should then be applied, and the worm extracted double, in the manner before mentioned.—*Bruce.*

Observations on the Dracunculus, or Guinea-worm. By the late Dr. Helenus Scott, of Bombay.

[Communicated to Dr. Johnson on the Author's departure for New South Wales, 1822.]

The Dracunculus, or Guinea-worm, deserves to be better known, for it gives rise to very important and very distressing effects in tropical climates. A thousand conjectures, and some of them very absurd, have arisen with regard to the natural history of this animal. Some writers deny its vitality, and a very recent author and well-known physician has said, that it is nothing but an inanimate prolongation of the cutis, like the string of a fiddle in its appearance, and in some of its properties. This is very entertaining!

A medical gentleman, a very few years ago, on the Malabar coast, looking at a gardener digging the ground, saw him turn up a quantity of something like the hairs of a horse. On inquiring what it was, for it excited no curiosity nor attention in the Indian, he was told that it was a quantity of Guinea-worms, and that during the rainy season they often found them in this state in the wet earth. He collected a considerable number of them, a sufficient quantity to fill a phial, into which he put them with alcohol. In this state he showed them to many, and gave a portion of the mass to a particular friend of mine, who is now no more. This occurrence took place soon after I left India, so that I never saw any of those that were found on this occasion, but I have as firm a conviction of the fact as I should have had if I myself had witnessed every part of the discovery. That those animals by which the human body is so often infested are bred in the moist earth there can now no longer be a doubt.

I had long known that the Guinea-worms become very abundant during the rainy season. The Indians who walk with their feet and legs bare are at this time sadly infested by this animal. That the ova from which it arises, or the young worms in a very minute form live in water is probable from the circumstance, that whenever the human skin is exposed to be wetted at this season, the Guinea-worm is soon found to effect a lodgment, and to give rise to all the symptoms of the well-known disease. It

may be asked how it happens that those minute worms are so seldom seen in the state of those dug up by the gardener? To this I can only reply, that perhaps the changes from a very minute form to one much more sensible may require but very little time, before the animals quit their subterraneous abode. Again I may observe, that Europeans are but very little employed in India in digging the ground, and especially during the rainy season, at which period only, those animals are in a visible state. Let me add to all this, that to make such an observation, requires a degree of attention that every man does not possess; but the natives, who alone meet with it often, seem well acquainted with the fact. It is well known that the men who in India are employed in camps or elsewhere to carry water in leathern bags on their backs, are infested by this animal over all that part of the skin that has often been wetted. From all this I conclude, that while yet in a minute, perhaps an invisible state, this animal resides in a moist soil, or in water, and that, coming into contact with the human skin, it adheres to it, and makes its way to the cellular membrane, which is the proper place of its residence. Wherever this membrane is diffused the worm finds its way. It generally lies just below the true skin, but it often goes far between the muscles, and I have known it residing very deep in the socket of the eyes, and without doing any material harm. I have known it take up its abode in the mouth, in the cheeks, or below the tongue. It often inhabits the scrotum, and in short wherever the cellular membrane extends the dracunculus finds a home.

There cannot be a doubt but that it has some locomotive power, though we never observe their motion after extraction. The first mark of the existence of a Guinea-worm is frequently a small blister on some part of the skin, like the appearance of the cuticle from the application of blistering plaster. If this little vesicle be broken from being rubbed, it often happens that the most insufferable itching is produced over the whole body. The animal seems, on its first exposure to the air, to be irritated, and to shed a poison by which the whole system is instantly affected. This does not happen in every case, nor does it twice take place from the same worm. I can never forget the sufferings that I experienced from this cause. Little thinking that I had a Guinea-worm under the skin, I left my house one morning, when I soon became extremely sick at stomach. This was followed or combined with an intolerable itching over almost every part of the skin. I soon resolved to go into a gentleman's house, about two miles from my own, and although very near it, I could no longer have patience, but tore off almost all my clothes, to be able the better to relieve this insufferable sensation. In this condition I left the carriage, and ran into the house in a state of misery and impatience that I cannot describe. I believe I excited considerable alarm, and I think not without reason, for I had much the appearance, and many of the feelings, of a madman. I soon, however, was supplied with a tub of water, and getting two or three men

to wet and rub my skin wherever I desired them, my feelings became more moderate. In an hour or two I was able to return to my own house, but the sickness of stomach and the itching did not quite leave me till the next day. I then saw and could take hold of the end of the worm, several inches of which I extracted with great ease.

I must now observe, that this animal has not the power of returning into the skin from which it has been drawn, not even in the smallest degree. It is elastic, so that on being stretched it may be drawn to a greater length like a thread made of worsted. This elasticity gives it the appearance of pulling itself backwards and of returning to its former residence. I am quite sure, however, that it does not possess such a power even in the least degree as I have just said. To how many errors may a wrong observation give rise? The fear of losing the worm by its retreating backwards, has given birth to much injurious practice and needless alarm. To prevent this retreat, it has been recommended to roll it on a quill, securing it with a thread, or to tie it in some other way that the prisoner may no longer be able to escape. The consequence of this tying and stretching and pulling are very hurtful in many cases, and always useless or needless. Although this animal appears so inert, and so insensible, it suffers from such treatment, and produces great suffering to the patient. On first being stretched and tied it no doubt finds itself uneasy, and it has the power of communicating great uneasiness to the patient, for soon after he becomes restless and feverish. The limb becomes inflamed and painful, and all this from causes that we cannot see. I have supposed that in its efforts to relieve itself it is agitated through its whole length, and becomes the means of exciting fever and much mischief. The best means of relieving this state of suffering, is to remove all the tyings and to apply a soft poultice to the part.

The native surgeons in India have a method of extracting the Guinea-worm which often answers very well; for a worm, even when of the length of three or four feet, is sometimes extracted in a few minutes. When a worm is known to exist in any limb, they endeavour to discover the way in which it is placed. They can often feel its convolutions below the skin, like a vein encircling the limb, or branching in various directions. They then raise the skin with a needle or pointed instrument, cutting off little portions of it till they have come to the animal below it. They, through this well or opening, introduce a probe or blunt instrument below the animal now laid bare, and getting hold of it double, they are often able to extract the whole of it at once. The success of this operation, however, much depends on the worm being placed in a soft or fleshy part, for if it get near the fingers or toes, or so close to any bones that its convolutions surround the bones, it is evident that it cannot be extracted without waiting, perhaps, for many days, till it is disposed of itself to relinquish its strong hold.

It has been thought that some means may be used to kill this worm without extracting it, an opinion that has given birth to a good deal of quackery. With such a view, I have known them use a variety of applications. I have seen the limb rubbed with mercurial ointment, and I have known a variety of vegetable poultices applied. They often take one of the thick and juicy leaves of the plant of the aloe succotorina, which is very common in India. They slit it open, and cutting it into a proper length they roast it over the fire, and apply it like a poultice to the part where the worm has appeared. This plant contains a very bitter juice, which I suppose was expected to be much disliked by the worm. It certainly makes a convenient and agreeable poultice in this way, and I have on some occasions supposed that it answered better than any thing else of that kind.

There are very many cases in which we cannot venture to make an opening in the skin for the extraction of the worm, or where it would not succeed. In such cases, it was my practice of late years, as soon as the worm had come out far enough to enable us to seize it, to pull it gently as long as it followed without resistance. I then with a pair of scissars cut off the whole of what had been extracted, leaving half or a quarter of an inch of it only. Over this a poultice or something soft was applied, and the part was tied up so as to defend the animal from farther injury. In this way I have succeeded in extracting the whole of the worm, never pulling it when I found any resistance, but bringing out as much as would readily come and cutting off daily what I had extracted, as at first. From this mode I have never seen any harm whatever to follow. All irritation is avoided, for the animal *seems* not to suffer from being cut in two, although it does from being stretched. The end of it is never long lost, for it continues to advance and make its appearance evidently retaining life and the power of motion. I have not unfrequently known the worm die in its subcuticular abode, giving rise to inflammation followed by abscess with a discharge of pus and the corrupted animal. If the worm make at first its appearance near to the foot or the hand, the case is often tedious and difficult in whatever way we treat it. The worm surrounds the bones so that we must break it, but cannot extract it. The best method is to be patient, for in time, although we have lost sight of it for many days, it will appear again, and if it do not die and give rise to suppuration, it will retain its tendency to advance in the same direction in which it had begun to move. The part first protruded is I suppose the head of the animal, and its future progress, though very slow and invisible, like the hour-hand of a watch, becomes in time very sensible. It seems to wish to escape from its prison, perhaps to assume a new form of existence, but what its next state may be we are at present in perfect ignorance; nor do I know by what means we can trace it farther, for although it be extracted from the body without apparent injury, it soon becomes rigid, after exposure to the air, and no longer gives any evidence

of animation, or the power of motion. A future day, I have no doubt, will throw more light on the natural history of this extraordinary animal, which has the power, occasionally, of rendering us very unhappy, of sometimes depriving us of the use of a limb, and even of putting a period to our existence.

XXXI.—Elephantiasis.*

Mr. Robinson conceives that two distinct varieties, if not different diseases, are confounded under one name; "and what is worse, are treated alike, though they require very different remedies." As elephantiasis, the lepra Arabum, is one of the most common, as well as "one of the most gigantic and incurable diseases" of Hindostan, I shall present a full analysis of Mr. Robinson's paper in this place, as it will thereby have a considerable circulation through our oriental and occidental dominions.

Variety 1*st*. Exhibits the following symptoms. One or two circumscribed patches appear upon the skin (generally the feet or hands, but sometimes the trunk or face), of a rather lighter colour than the neighbouring parts, neither raised nor depressed, shining and wrinkled, the furrows not coinciding with the lines of the contiguous sound cuticle. The skin of these patches, is insensible even to a hot iron. They spread slowly until the skin of the legs, arms, and whole body is completely involved, and deprived of sensibility. It is in this state, chiefly, that the disease is remediable.

After a period, varying from two months to five or six years, symptoms indicative of internal disease, or functional derangement, are developed. The pulse becomes slow and heavy, the bowels torpid, the toes and fingers numbed, as with frost, appearing glazed, somewhat swelled, and nearly inflexible. The mind exhibits corresponding traits of torpor and inactivity; the soles of the feet and palms of the hands crack into fissures, dry and hard, as the parched soil of the country, the extremities of the toes and fingers, under the nails, being encrusted with a furfuraceous substance, and the nails themselves raised up until absorption and ulceration occur. Still there is no pain. The legs and arms now swell, the skin is every where cracked and rough, cotemporary with which symptoms, ulcers appear at the inside of the joints of the toes and fingers, directly under the last joint of

* On the Elephantiasis, as it appears in Hindostan. By James Robinson, Esq. Superintendent of the Insane Hospital at Calcutta. Medico-Chirurgical Transactions, vol. x.

the metatarsal or metacarpal bones; or they corrode the thick sole, under the joint of the os calcis or os cuboides, without any preceding tumour, suppuration, or pain, but apparently from simple sloughing off of the integuments, in layers of half an inch in diameter. A sanious discharge comes on; the muscles, in their turn, are destroyed; and the joint being penetrated as by an auger, "the extremity droops, and at length falls a victim to this cruel, tardy, but certain poison." The wound then heals, and other joints are attacked in succession, every revolving year bringing with it a trophy of this slow march of death! The patient, though a spectacle of horror to others, and a burthen to himself, still clings to life, and endeavours to cherish its remaining spark, by voraciously devouring all he can procure. "He will often crawl about with little but his trunk remaining, until old age comes on, and at last he is carried off by diarrhœa or dysentery, which the enfeebled constitution has no stamina to resist." Although the general health and the digestive functions do not suffer much throughout this long and tedious dismemberment, yet "a sleepy inertness overpowers every faculty, and seems to benumb, almost annihilate, every passion, as well of the soul as of the body, leaving only sufficient sense and activity to crawl through the routine of existence." This, our author considers, as a distinct variety of elephantiasis, to which, on account of its most prominent trait, he would give the name of elephantiasis anaisthetos. He has never seen the larger joints attacked (a strange assertion after telling us that the patient creeps about with "little but his trunk remaining"), the nose destroyed, or any bones affected, save those of the hands and feet. The tuberculated species, hereafter to be described, sometimes supervenes, "but is by no means connected with, caused by, or necessarily subsequent to this disease."

Treatment.—If we see the patient in the first stage, before described, the prognosis may be favourable. A combination of mercury and antimony, with topical stimulants, will generally succeed. A blister alone, kept open for a few days, will often restore the sensibility of the skin, and check the disease.

"Whenever the foot or hand alone is affected, I usually apply a strip of blistering plaster one inch and a half wide all round the limb, just upon the line which marks the sound from the affected parts. Where this is inapplicable, from the extent of the disease, I apply a solution of muriate of mercury, made as follows:

"℞. Hydr. muriat. gr. viij. Acid. muriat. gt. xx. Tere in vit. mort. deinde adde Spt. vini rectif. ʒß. Aq. font. Oij. M. This must be rubbed well on the skin, wherever affected."

Mr. R. at the same time, gives to an adult, half a grain of calomel, three grains of antimonial powder, and from six to ten of rad. asclepiæ giganteæ every eight hours. This last medicine was discovered several years ago by

Mr. Playfair, and our author thinks the professional world greatly indebted for the discovery of "the most valuable medicine hitherto derived from the vegetable kingdom." Mr. Playfair emphatically describes it as "a vegetable mercury, specific in the cure of lues venerea, leprosy, and cutaneous eruptions in general, the most powerful alterative hitherto known, and an excellent deobstruent. In all affections of the skin, says he, I have found it very effectual; and in the jugaru or leprosy of the joints, I have never failed to heal up all the ulcers, and often have produced a perfect cure."

In the complaint under consideration, Mr. Robinson agrees with Mr. Playfair, that the asclepias, called in Hindostan "*Mudar,*" is possessed of great virtues. He can also bear witness to its powerful effects as a deobstruent and sudorific in almost all cutaneous eruptions, arising from obstructed perspiration, and an apathy of the extreme vessels. It causes a sense of heat in the stomach, which rapidly pervades every part of the system, and produces a titillating feel upon the skin from the renewed circulation through the minute vessels. It is inadmissible where the infection is inflammatory, or the eruption pustular. Mr. R. tried it freely in lues venerea, but cannot venture to recommend it as a substitute for mercury. "It will enable you to heal a chancre, but does not eradicate the poison." In secondary symptoms, he considers it an admirable ally. Where mercury has been used, but cannot be safely pushed farther, the *Mudar* rapidly recruits the constitution, heals the ulcers, removes the blotches from the skin, and perfects the cure. The bark of the root is the only part of the plant that is useful in medicine, and should be gathered in March, April, or May. The bark, when well dried, is easily beaten into a fine powder, of which the dose is from three to ten grains. It grows in great plenty and wild throughout Hindostan.

Variety 2*d.*—Mr. Robinson would denominate elephantiasis tuberculata, which has been often described, and is now occasionally seen in this country. A very exquisite specimen was lately exhibited at Edinburgh, a plate and case of which is given in the Monthly Series of the Medico-Chirurgical Journal, by Dr. Lee. I shall not, therefore, copy Mr. Robinson's description of the disease, as he draws his delineation principally from the late Dr. Adams, and Dr. Bateman. In the tuberculated variety, the asclepias does harm; and is therefore inadmissible. Arsenic, in small doses, is the most useful medicine our author has found, but it is very far from being generally effectual.

Upon the whole, this is an interesting paper; and Mr. Robinson is entitled to the thanks of the profession for having made known to them a vegetable possessed of such valuable properties as he ascribes to the asclepias gigantea.

Observations on the Lepra Arabum, or Elephantiasis of the Greeks, as it appears in India. By Whitelaw Ainslie, M.D. M.R.A.S. From the first volume of the Transactions of the Royal Asiatic Society, 1826.

This paper of Dr. Ainslie's, as might be expected from the great learning of the author, contains many curious researches respecting the name, history, nature, and treatment of this dreadful and loathsome complaint. We regret that our limits will not permit us to indulge in extracts from the literary disquisitions and erudite researches of this truly talented and learned physician: but compel us to keep as close as possible to the subjects of nature and treatment. It would appear that this disease varied in respect to prevalence, at different æras, even in the same countries. Thus Galen avers, that it was very common in Egypt in his time, though Savary says he never saw an instance of it while he travelled through that country. In India it is very prevalent, and the most piteous wretches are often seen covered with scurf, or deprived of their fingers and toes. Dr. Ainslie considers the definition of Sauvages as the best. "Facies deformis tuberibus callosis, ozœna, raucedo, cutis Elephantina, crassa, unctuosa, in extremis artubus anæthesia." Cullen omits an essential symptom, ozœna, which is never absent in the advanced stages. Dr. A. is very doubtful that it is at all contagious, in which he is confirmed by the testimony of the best Tamool doctors, who deny any infectious quality in the disease. Of three Europeans who died of elephantiasis, under Dr. A. none of the wives or servants became affected with the complaint. There is every reason to believe, however, that this species of Leprosy is hereditary—at least, it is very common for children, born after the malady has commenced in the parents, to be attacked by it. The Hindu doctors have no doubt of its transmission in this way. Some authors, as Hillary, Sonnini, and Bancroft, have noticed the salacity of lepers; while Adams and some others have observed a wasting of the testicles. In two instances which we lately saw in this country—one at Brighton, there was this wasting of the testicles. Such a circumstance, however, is not incompatible with their having families—at least during the early stages of the disease, before the general debility becomes excessive. In India, Elephantiasis is by no means of rare occurrence, sparing neither caste nor sect, though much more commonly found among the poor than the rich, for obvious reasons. It seldom shews itself before puberty—but when it does, it wonderfully represses the growth of the body. They soon become meagre, shrivelled, and miserable, with shrill and nasal voices. With coming years they evince little sexual desire, the beard either not appearing, or being of a very delicate texture. The mind, of course, is curtailed of its fair proportions, in correspondence with the body. The malady generally begins its depredations about the age of 23 or 24 years—seldom later than forty, and the following are the symptoms,

according to Dr. Ainslie's observations, which mark the approach, progress, and termination of this frightful disease.

" The unhappy person fated to perish by this slow but relentless affliction, first perceives an unusual dryness and slight roughness of skin in his hands, feet, arms, and legs, which, even after violent exercise, do not transmit the perspiration readily; he begins to fall off a little in his appetite, and to be much troubled with flatulence and other signs of indigestion, but he is as yet not ill enough to be alarmed, and pursues his customary occupation: his sleep, soon after this, in place of being refreshing to him as it used to be, is disturbed by wild dreams, and he frequently during the night starts up, in a fright, with a palpitating heart and sense of suffocation. About six weeks or two months from the time of his first being taken ill, his colour begins to change; if he was rather a fair man, he grows at least two shades darker, and his features lose much of their natural aspect, becoming somehow tumid and less agreeable than formerly. The dryness and roughness of skin increase, and about the end of the third month he complains of a strange numbness in his hands and feet, which he can allow to be pinched without feeling pain: his pulse, which was most likely always feeble, will, if felt, be found to be extremely languid, small, nay, at times, scarcely to be perceived. The aridity and unevenness of skin now extend further, reaching as high as the middle of the arm and leg; indeed, the cuticle over the whole body seems rigid, harsh, and to have entirely lost that smooth and healthy look which it had before the lepra made its primary attack. About this period many dark-coloured spots and purple tubercles usually appear on the ankles and wrists, and partially on the legs and arms; they are in shape not unlike segments of ripe currants, but flatter at top, and of a singular shining and oily aspect; they are not attended, however, with any pain, neither are they particularly itchy, which in truth they could not well be, when we consider that they are subsequent to the want of feeling which I have above described. Some of the tubercles occasionally disappear suddenly, and return again, without evident cause; others generate a small quantity of ichorous matter, which, drying, occasions a trifling scurfy desquamation. At this stage of the malady, I have met with one or two cases in which glandular swellings at the upper and inner part of the thigh made their appearance, similar to those mentioned by Dr. Adams; but, as far as I can learn, this is by no means so constant a symptom of the disease in India as it seems to be in Madeira. The leprosy advancing, the tubercles increase in size and number, and seizing on the face, render the infected person a most unsightly object. It must here be remarked, that, up to this period, the breast, abdomen, and back, either remain tolerably smooth, or the tubercles are comparatively much fewer upon them; they are moreover smaller in size, nor ever on those parts do they occasion much white desquamation, the natural consequence of their greater vitality. About the end of

the first year, every symptom is much aggravated: the dryness and rigidity of skin become universal, are distressing in the greatest degree; the numbness has extended to above the knee, and is so great, that the poor sufferer may, through inadvertency, burn his hands or feet to the bone without perceiving it: the surface of the whole frame assumes a bright yet unctuous appearance; when narrowly examined, it looks wrinkled longitudinally, and not unfrequently feels, in those parts where feeling remains, as if stung with nettles, rising up into wide-spreading irregular bumps, which come and go. The skin about the wrists and ankles, where the tubercles have scaled off, has a scurfy appearance, and here and there a raw excoriation may be perceived, the consequence, perhaps, rather of chafing than ulceration. The countenance alters still more; the cheeks grow bloated and puffy, and are studded, if I may so say, with irregular dark protuberances; the muscles of the forehead enlarged, seem as if pushed downwards; the eyebrows, thickened and swollen, hang over the eyes, which being in every instance inflamed and rheumy, and having been made to look rounder by the pressure from the neighbouring parts, resemble those of some wild animal; the lobes of the ears are rough, knotty, and mis-shapen; the tongue is foul, and is in some cases blistered with tubercles, which bleed; the breath is fetid; the voice sounds unpleasant; the urine is plentiful, and generally turbid, having a most unnatural odour; the bowels irregular; the hairs of the head gradually fall off; the parts of generation shrink; the nails break and waste away; the fingers and toes seem as it were withered, the former bending inwards as if crampt, and the heels and soles of the feet are disfigured by deep fissures. The disease gradually going on, and the humours of the body becoming, from the impeded transpiration and general stagnation, daily more corrupt; the voice, which was but six months before only unpleasant, owing perhaps to tubercles on the uvula and palate, has now a most discordant, nasal, and unnatural sound; the *alæ nasi* are swelled and scabrous, and the bones themselves of that organ are in certain cases flattened, and twisted in some degree to one side, giving to the countenance a distorted look. A most offensive ichor now distils from the nose; neither rest nor food tend to refreshen or invigorate, and all carnal appetite, in place of being increased, as some authors imagined, entirely dies away.

"In this condition, with many of the grand functions which support life deranged, it may easily be imagined that existence must be a state of misery; and the conviction that there is no hope whatever of recovery, makes the wretched leper still more an object of pity.

"In the advanced state to which I have brought, in description, the Lepra Arabum, as it appears in India, the malady will sometimes continue for several years, apparently having come to an ultimate stand; but, alas! with declining years, is sure to come progressive misery; every symptom is finally rendered worse; the already ugly become loathsome; on the

most trifling motion the respiration is hurried, and the dyspnœa is most tormenting, owing in all probability to the perspiration being obstructed over so great a part of the surface of the body, and the certain accumulation of morbific humours: when any exertion is used sufficient to excite diaphoresis, the only parts that perspire are the neck and a little round the waist; the face, legs, arms, and thighs are thereby merely rendered clammy, and the tubercles on them turgid. At this time a feverish attack comes on regularly every evening, which may be discovered by the increased heat of the axilla, and the eyes assume that dim but brassy appearance, so properly noticed by Aretæus; pulsation is no longer felt any where, but by pressure over the heart itself; the whole frame is emaciated, the face is frightful to behold, the voice sounds hollow as if from the tomb; the hands and feet now, from long want of due nourishment, begin to give way; partially blistered-looking ulcerations taking place over their joints; they gradually drop off, and so add helplessness to misery and long-protracted calamity. Soon after this stage, comes the last closing scene; worn out by lingering and hopeless wretchedness, dead almost to every feeling of body as well as mind, the poor leper hastens to his grave: yet, cadaverous as he is, he is not deserted in his expiring moments, but finds a humane and charitable support from the more prosperous of his race. If a Pariah, he is taken care of by those of the same rank till death comes to his relief; if a Hindu or Muhammedan, he is cherished by the individual benevolence of his sect or caste; and, having been conveyed to the vicinity of some pagoda or mosque, breathes out his dying prayer on what he conceives to be sacred ground!" 12.

The above most excellent graphic delineation of elephantiasis appertains, of course, to the disease as it appears unchecked by medical aid. It is, however, modified in individuals by peculiarity of constitution or other idiosyncrasy. In poor and badly-fed people, whose circulation is languid, and whose stamina are weak, the lepra will soon reach to its greatest height—whilst among the upper classes, its progress will be much retarded. Our author cannot agree with Mr. Robinson (Med. Chir. Trans. vol. x.) in making two varieties of this disease—the one characterised by want of feeling in the extremities—the other by tubercles. Dr. A. has never met with a case of the genuine disease which was not distinguished by both these peculiarities.

Dr. A. has already expressed a doubt as to any contagious property in the disease—but assigned reasons for believing it to be hereditary. But there is another question—can lepra occur independently of any constitutional predisposition? Dr. A. is inclined to think it may occur, under a particular combination of causes, in most regions of the Torrid Zone. It is a curious and singular fact, that, in every instance of lepra which Dr. A. has seen in the European—that European was either a German, a Dane, or a Swede—"but never an Englishman." From the investigations of Mr. Stewart,

stationed at Tranquebar, where lepra is very common, the following results were obtained.

" 1st. That women are less liable to suffer from Elephantiasis than men.

" 2d. That the disease is most certainly hereditary.

" 3d. That its being in any degree contagious is extremely problematical.

" 4th. That every leper, suffering from an advanced stage of the malady, doubts whether he is capable of propagating his species.

" 5th. That a fish diet is found to render every symptom worse.

" 6th and lastly. That poor living, want of cleanliness, mendicant misery, and exposure to cold and damp, are but the too constant attendants of this dreadful affliction." 15.

We deem it useless to notice the etiological speculations of various authors—since none of them appear to rest on a solid foundation.

Treatment.—In this, as in all other hereditary complaints, much good may be done by avoiding what has been termed the exciting causes. As to a *cure,* when the disease is actually formed, there is little chance of that. The modern Arabian physicians trust chiefly to mercury. Dr. Hillary avoided mercury, and prescribed sarsaparilla. Dr. Towne thought that antimonial medicines afforded the greatest relief, and that mercury aggravated the complaint. Dr. Ainslie always endeavoured, in the first place, to improve the general health of the patient by nourishing diet, exercise, and cleanliness. Then he appears to think that a cautious trial may be made with the oxymurias hydrargyri, in conjunction with warm bathing—and, when we have done our utmost by these means, we are to endeavour to support the frame by generous wine or other cordial. The mineral acids are, he thinks, of unquestionable service in this dreadful malady. So is the vinum antimonii compositum of the Pharmacopœia Chirurgica. The Hindu practitioners, for ages past, have considered the white oxide of arsenic as a powerful remedy in lepra Arabum. Our author was disappointed in the trials he made with this medicine.

" But of all the alterative and deobstruent remedies employed by the native practitioners of India in this complaint, none is of equal repute with the concrete milky juice of the plant called by the Tamools *Yercam* (Asclepias Gigantea); it exudes from the leaves and tender shoots on being pricked, and has, at first, somewhat the appearance of cream; but on drying becomes a little darker coloured, and has a rather nauseous and acrid taste; the dose is about a quarter of a gold pagoda weight, given twice daily, together with a little sulphur, and continued for some weeks." 21.

The pathology of this disease is involved in much obscurity. With the following short extract, we must conclude our notice of Dr. Ainslie's interesting Essay.

" The appearances of the body on dissection do not throw much light on the peculiar nature of the malady, further than that I have observed in

such cases the heart to be usually small, and the arterial system altogether shrunk and collapsed: the liver I have in one or two instances found indurated, and the gall-badder for the most part distended with viscid and very dark-coloured bile; the contents of the abdomen had, generally speaking, an unusually pale and wasted appearance: the bones, when laid bare, were dry and brittle; the testicles, in one or two instances, were almost entirely obliterated; and, on opening the head, it has appeared to me that there was a more than ordinary determination of the blood to the membranes of the brain." 23.

MEDITERRANEAN.

I.—General Observations on the Climate.

When we cast an eye along the beautiful shores of this great inland ocean, and survey the classic scenes which present themselves at every step—when we recollect that in peace or in war, the British flag, commercial or belligerant, waves in every port, and off every promontory, from the pillars of Hercules to the shores of the Hellespont, we cannot but acknowledge that the medical topography—the endemic—and the contagious diseases of this quarter of the globe, are not less interesting to Britons than those of either the Eastern or Western Hemisphere. The more intimately we become acquainted with the various climates of the earth we inhabit, the more we shall be convinced that the "balance of comfort" is not so unequally poised as some querulous philosophers imagine. The Eastern world has its *hepatitis*—the Western its *causus*—the Northern shores of the Mediterranean have their "*pestilential fevers*"—the Southern and Eastern are annually desolated by the *plague!* If "happy England" knows not these but by report, or in their sequelæ, she every year sacrifices nearly *sixty thousand* of her inhabitants at the altar of *Phthisis!*

In exploring this interesting tract, the labours of many must be united in *analytical* concentration; and it is upon this plan, hitherto unattempted, that I hope to condense into one focus, a stronger body of light on diseases of hot climates generally, than has ever before been collected through a single medium.

Before entering on localities, however, it may not be improper to make a few general observations on this extensive inlet.

Placed between the burning sands of Africa on one side, and the Alps and Pyrenees on the other, the Mediterranean skies are alternately parched by the south-east—chilled by the north-west, or stifled by the sirocco winds. Thus from Barcelona to Genoa, the iron-bound Coast presents a succession of dreary mountains and craggy rocks, the tops of the *former* being frequently covered with snow, from the beginning of March till the end of May. From these the frigid Euroclydons descend in whirlwinds upon the contiguous ocean; while at other times, the sirocco breathes fire from the deserts of Sahara and Lybia. During the continuance of this wind, all nature appears to languish: vegetation withers and dies—the beasts of the field droop; while those who are strongly susceptible to

electrical changes in the air, such as precede and attend a thunder-storm, will easily understand the effects of the sirocco on the human frame, as an increased degree of the sensations which they then experience. The animal spirits seem too much exhausted to admit of the least bodily exertion, and the spring and elasticity of the air, appear to be lost. The heat exceeds that of the most fervid weather in Spain or Malta. This accession of temperature is rapid—almost instantaneous; and the whole atmosphere feels as if inflamed. The pores of the skin seem at once opened, and all the fibres relaxed. It sometimes blows for several days together, at a medium heat of 112°, depressing the spirits, and so suspending the powers of digestion, that people who venture to eat a hearty supper are often found dead next morning. Fortunately for animated nature it is commonly succeeded by the Tramontane or north wind, which, in a short time, restores the exhausted powers of animal and vegetable life.

After this description, the Mediterranean climate could hardly be set down as one that was favourable to the lungs of a Northern invalid seeking refuge from the atmospherical vicissitudes of England. Yet numerous writers describe this portion of the globe as enjoying a happy medium between intertropical heat and hyperborean cold. But we must not calculate on heat, cold, or evenness of temperature by the parallel of latitude; on the contrary, as a modern author has justly observed, "storms most tremendous occasionally burst from the mountains, with the most piercing coldness, on many of the boasted retreats along the Northern shores of the Mediterranean." But from words we shall proceed to facts. The following table shews the *comparative* receipt of pulmonic and other diseases into the hospitals of Minorca, Malta, and Gibraltar, from the Mediterranean fleet, during the years 1810-11-12, from official returns:—

Diseases.	Malta.	Gibraltar.	Minorca.	Total.
	1810-11-12	1810-11-12	1810-11-12	
Phthisis Pulmonalis..	149	187	119	455
Pulmonic Inflammation	52	51	37	140
Fever.....	747	138	357	1242
Dysentery	36	79	60	175
Total Phthisis and Pneumonia	202	238	156	596
Other Complaints....	883	217	417	1517

Ratio of Pulmonic to the other great complaints, 1 to 2½.

The foregoing table shews only the comparative receipts into hospital o the grand divisions of disease. The rate of mortality is quite another thing Out of 455 cases of Phthisis alone, 151 died before the remainder could be shipped off for England, where, in all probability, most of them perished! Whereas out of 1242 cases of fever, only 58 died, and a very small number were invalided. This authentic document will speak volumes on the climate of the Mediterranean. In no other possible way could so fair a calculation be made, as to the *relative* prevalence of complaints, as in a fleet, where the crews of ships are subjected to a similarity of regimen, occupation, cloathing, and discipline unknown in civil life, or even in the best regulated army.

That the abrupt vicissitudes of the climate under consideration were extremely productive of pulmonary consumption, the government, and the medical officers of our fleets and hospitals have long been aware; but in private practice, this is little known; and many valuable lives are annually sacrificed by the very means designed to prolong their range.

An ingenious little Thesis has lately been written in Latin by Dr. Sinclair, formerly a surgeon in the Royal Navy, on the Mediterranean Phthisis, from which I shall translate and condense a few passages.

Symptoms.—Dr. S. divides the disease into two stages, the inflammatory and suppurative. The first often advances on the patient with insidious pace, and without giving much alarm:*—frequently with symptoms of catarrh, or slight pleurisy, as rigors, heats and chills alternately—thirst—cough—fever. By degrees these symptoms become more marked, and attended with lassitude—pains in the back, loins, and limbs. To these are occasionally added, nausea, vomiting, headache, &c. The pulse is generally from the beginning, quick, hard, and full—sometimes the contrary. Acute pains, more or less severe, now shoot in between the sixth and seventh ribs near the sternum. Sometimes this pain is complained of as deep under the breast-bone—quite through to the spine—or stretching to the clavicles, or shoulder bones, with difficulty of breathing. These symptoms will often become suddenly increased, with such oppression about the præcordia, and obstruction of the vital functions as lead to suspicion of inflammation of the heart itself or its coverings. The patient is now harassed with a dry, irritating cough—dyspnœa, and inability to lie down. These symptoms

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* Sir Wm. Burnett while speaking of pneumonia in the Mediterranean, observes that —"He wishes to caution the practitioner against the *insidious form of the milder attack of this disease*, which is but too often considered of little moment—*as a catarrh*—and the cure entrusted to small doses of antimony and a great coat—often to Nature. With pain has he witnessed the effects of this treatment in the *melancholy increase of consumptive cases*, which the Summer's heat has brought before him."—*Preface to 1st Edition.*

are somewhat mitigated on the appearance of expectoration, which is rarely free, or tinged with blood. In some people, who are biliously inclined, the pain in the right hypochondrium will imitate hepatitis, till purulent expectoration reveals the true nature of the disease.

The termination is either by resolution—suppuration, with ulceration of the worst kind—or effusion.

Resolution.—In this case, the graver symptoms subside before the close of the first septenary period—that is, about the seventh day, the pain ceases—the pulse becomes slow—the expectoration free, whitish, and thick—the skin relaxes into a gentle perspiration—the thirst is assuaged—and the appetite returns. If these salutary events do not take place before the fourteenth day, suppuration is generally the consequence.

Suppuration.—In many cases, although the violence of the disease is mitigated by appropriate remedies; yet a deep-seated, obtuse pain continues obstinately fixed in one side, with a sense of weight there. The difficulty of breathing remains, and the patient cannot lie down. Debility now increases fast—emaciation takes place—the pulse is easily accelerated—the expectoration from being viscid and frothy, becomes, in a few weeks, opake, yellow or green. In short, hectic fever is established, and PHTHISIS carries the victim to his grave in the course of five or six months—generally towards the latter end of August or September.*

Post Mortem Appearances.—Vomicæ of various dimensions were very often developed. The larger contained from a few ounces to a pint of fetid green or yellow pus. In some cases empyema—in others, the lungs were ulcerated—beset with tubercles of different sizes, or entirely destroyed, with only a mass of tubercles remaining—and that too within six weeks after the stage of acute inflammation!

Methodus Medendi.—During the inflammatory period, nothing but the most decisive evacuations from the vascular system will save the structure of the lungs from that dreadful disorganization described above, and which supervenes on inflammation in the lungs in a more rapid manner, here, than in any other climate. Twenty-four or thirty ounces of blood must be immediately abstracted, and this reiterated according to the violence of the disease. Saline cathartics—cool air—cool drink—rigid abstinence—antimonials—blisters, &c. are to be used as secondary means. In these cases, it is not always easy to limit the extent of ulterior venesection. If we bleed *too* far, we risk effusion—if *too* little, suppuration.—This is a

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* Autumnus tabidis malus.—*Hippoc.*

most critical and dangerous period of the disease. About the fourth or fifth day, we shall apparently have conquered all the more violent symptoms, and the patient will be considered convalescent—but all at once, he is seized with darting pains in the chest—the muscles of respiration are spasmed—and strangulation is threatened by the convulsive cough! Blood must again be drawn, but with caution, for the transition from this state to irremediable effusion is awfully sudden and uncertain. Here local evacuations, and other local means may be beneficially put in requisition.

When PHTHISIS approaches, nothing but a retreat from the Mediterranean before the Autumn sets in, can give a shadow of hope or safety to the patient—

> Frustra per autumnos nocentem
> Corporibus metuemus Austrum.—*Hor.*

as has been proved by the *recovery of many invalids,* when sent home, in the Autumn, from our fleet. "Non alio modo evitari possunt, quam Cœlum salubriori mutando; quod *invalidi plurimi donum,* e classe nostra, in autumno quotannis remissi, sanescendo, confirmant."—*Thesis, p.* 30.

Dr. Sinclair remarks, that as, in the months of *January and February,* the air is clear, temperate, and steady in the Mediterranean, they are the only months in which a *phthisical* invalid can safely sojourn on the shores, or navigate the waters of this inland ocean.

Since the publication of the last edition of this work, we have received the following conclusive confirmation of our estimate of Mediterranean climate, in the Statistical Reports of Major Tulloch—works of incalculable value in all that relates to climate and its influences:—

"In no way can the relative influence of climate in inducing any particular disease in different countries be more accurately estimated, than by a comparison of the proportion attacked annually out of a given number of individuals resident in each. If we apply this test to the Mediterranean stations, by investigating the relative prevalence of consumption among the troops there and in the United Kingdom, we obtain the following results:

	Aggregate strength of 7 years from 1830 to 1836 inclusive.	Total attacked by consumption in these seven years.	Ratio per 1,000 of mean strength attacked annually.
United Kingdom	43,163	286	6·6
Gibraltar	22,868	187	8·2
Malta.....	15,031	101	6·7
Ionian Islands	24,401	129	5·3

"We have already alluded to this subject in a more general way, in the course of our observations on diseases of the lungs in each of the Mediterranean commands, but we can now speak with more certainty from results

extending in each instance over the same seven years, and embracing a large number of individuals of the same profession, the same age, the same habits, and having, except at Gibraltar, the same diet. This affords so accurate a standard of comparison as to place beyond a doubt the interesting fact, that, except in the Ionian Islands, the liability of troops to consumption in the Mediterranean stations is even greater than in the United Kingdom. We have not compared the deaths by consumption for a similar period, because conclusions could not have been drawn in regard to the relative mortality with the same accuracy, so many labouring under that disease having died on their passage home or after their arrival in this country; but, from all the information we have been able to obtain, there can be no doubt that, if due allowance is made for these casualties, the proportion of deaths also, among those attacked by consumption, will be found fully as high in the Mediterranean as in the United Kingdom.

"We might have carried this comparison further, and shown how little influence temperature has on this disease, by the fact that it is still more prevalent and fatal in the Mediterranean than in North America, where the soldier has frequently in the course of his duty to be exposed to the night air, when the thermometer is several degrees below zero; but we defer entering on any more extensive comparison of this kind till we have an opportunity of adducing evidence on that subject in a more detailed form.

"These facts offer a striking contradiction to the popular idea regarding the influence of sudden atmospherical vicissitudes, and rapid alternations of temperature, in inducing this disease; but it is even more remarkable that similar results should be obtained in regard to the relative prevalence and mortality by pleurisy and inflammation of the lungs, which are supposed to be still more influenced by these agencies:—

Stations.	Aggregate strength of 7 years from 1830 to 1836 inclusive.	Total attacked by pleurisy and inflammation of lungs in same period.	Total died of these diseases in same period.	Ratio per 1,000 of force attacked annually.	Ratio per 1,000 of force died annually.
Great Britain....	43,163	720	37	17	·9
Gibraltar	22,868	655	13	29	·6
Malta.....	15,031	456	28	30	1·8
Ionian Islands ..	24,401	556	30	23	·9

Here then, we find that inflammatory affections of the lungs are nearly twice as prevalent in the Mediterranean as among the same number of troops in the United Kingdom, and that in the mild climate of Malta they are also twice as fatal.

"These facts, combined with a careful examination of the abstracts in the

Appendix, lead to the inference that residence in the Mediterranean, though so often recommended to patients labouring under pulmonary affections, is by no means likely to be attended with beneficial results: in some cases, no doubt, change of air, change of scene, and the sea voyage, may have benefited a patient, and led to a partial recovery, but the same would in all probability have taken place wherever he had been sent, it being by no means likely that any beneficial influence can be exerted by the climate itself, when a body of selected soldiers, subject to no severe duty, and exposed to no hardship, lose annually a larger proportion of their number by consumption than in the United Kingdom. The inference, however adverse to generally received opinions, is strikingly corroborated by the prevalence of consumption and other pulmonary affections among the civil inhabitants of Malta, as shown in Appendix No. III. of this Report."

The general influence of the climate of the Mediterranean will best be exhibited by a numerical statement of diseases in the three commands, namely Gibraltar, Malta, and the Ionian Islands, from 1818 to 1836 inclusive, as given in the Statistical Reports of Major Tulloch:

GIBRALTAR.

	Admissions.		Deaths.	
	Total among whole force in 19 years.	Annual ratio per 1000 of mean strength.	Total among whole force in 19 years.	Annual ratio per 1000 of mean strength.
By Fevers	9687	161	563	9·3
,, Eruptive Fevers	54	1	1	
,, Diseases of the Lungs	8487	141	318	5·3
,, Do. of the Liver	759	13	22	·4
,, Do. Stomach & Bowels	11202	186	128	2·1
,, Epidemic Cholera	459	7	131	2·2
,, Diseases of the Brain	371	6	32	·5
,, Dropsies	72	1	16	·3
,, Rheumatic Affections	2309	38	8	
,, Venereal Affections	3450	57	1	
,, Abscesses and Ulcers	6131	102	9	
,, Wounds and Injuries.	5372	89	24	1·3
,, Punished	938	16	..	
,, Diseases of the Eye	5862	97	..	
,, Diseases of the Skin	903	15	..	
,, All other Diseases	2171	36	38	
Total	58227	966	1291	21·4

MALTA.

	Admissions.		Deaths.	
	Total among whole force in 20 years.	Annual ratio per 1000 of mean strength.	Total among whole force in 20 years.	Annual ratio per 1000 of mean strength.
By Fevers.....	7078	173	118	2·9
,, Eruptive Fevers.....	34	1	3	·1
,, Diseases of Lungs	4883	120	245	6·0
,, Diseases of Liver	857	21	47	1·1
,, Do. Stomach & Bowels	6317	155	147	3·6
,, Diseases of the Brain..	236	6	30	·8
,, Dropsies.....	70	2	16	·4
,, Rheumatic Affections..	1383	34	9	
,, Venereal Affections ..	7336	180	2	
,, Abscesses and Ulcers..	6013	147	7	
,, Wounds and Injuries..	4105	100	23	1·4
,, Punished.....	1628	40	..	
,, Diseases of the Eyes..	4162	102	..	
,, Diseases of the Skin ..	858	21	..	
,, All other Diseases	1679	40	18	
Total.....	46639	1142	665	16·3

IONIAN ISLANDS.

	Total admissions in 20 years.	Total Deaths in 20 years.			Annual ratio per 1000 of Mean Strength.	
		In the Ionian Islands.	Among invalids sent to Malta.	Of both classes.	Admitted	Died.
By Fevers.....	32160	887	29	916	457	13·
,, Eruptive Fevers.....	58	2	..	2	1	
,, Diseases of Lungs....	6313	320	17	337	90	4·8
,, Diseases of Liver	1168	56	2	58	17	·8
,, Do. Stomach & Bowels	10969	237	10	247	156	3·5
,, Diseases of the Brain..	693	69	2	71	10	1·
,, Dropsies.....	183	43	1	44	2½	·6
,, Rheumatic Affections..	2428	7	..	7	34½	
,, Venereal Affections ..	4660	3	..	3	66½	
,, Ulcers and Abscesses..	8199	8	..	8	117	
,, Wounds and Injuries..	8442	28	..	28	120	1·5
,, Punished.....	2614	1	..	1	37	
,, Diseases of the Eyes..	2903	..	..	..	41	
,, Diseases of the Skin ..	1241	1	..	1	17½	
,, All other Diseases	2407	49	3	52	34	
Total.....	84438	1711	64	1775	1201	25·2

The influence of the climate of the Mediterranean generally, in producing fever will be best exhibited in the following numerical comparison, taken from the same authority :—

	Admissions per 1000 of Mean Strength Annually.		
	Gibraltar.	Malta.	Ionian Islands.
By Intermittent Fevers	5	8	132
,, Remittent Fevers	5	9	90
,, Common Continued Fevers	117	152	220
Total.....	127	169	442

II.—Mediterranean Fever.

Analytical Review of Dr. (now Sir William) Burnett's *Work on the Bilious Remittent Fever of the Mediterranean.**

If the destructive war, which ravaged the world for more than twenty years, has consigned millions to an early grave, it has, like most human events, been productive of good as well as evil. In a medical point of view it has called forth original genius, in combating the maladies to which we are subjected by our emigration or military enterprizes; and we are much mistaken, if it has not thrown great light on a disease, the nature of which has puzzled the physicians and philosophers of all ages. The awful forms which Fever assumes in fleets and armies beneath the burning skies of the East and West Indies, and round the romantic shores of the Mediterranean, gave rise to bold and energetic measures of cure, which never could have originated in the retired paths of private practice. A cursory view of our military and naval medical writings, must clearly evince the truth of this remark. But these innovations were regarded with a dubious eye by our medical brethren at home; and although the host of prejudices, engendered in the humoral, spasmodic, and Brunonian Schools are now fast dispersing, it is necessary to give every new *fact*, illustrative of a more rational theory and successful practice, the widest publicity, since the phantoms of " debility

* Med. Chir. Journal, Monthly Series. Since this analysis was first drawn up, Sir William Burnett has published a second edition of his valuable work, which ought to be in the library of every naval and military surgeon.—*J. J.*

and putrescency" continue still to haunt the minds of a certain portion of medical practitioners.

The first part of this volume proposes to give " a faithful and practical account of the disease, as it appeared in the ships and hospitals of the Mediterranean fleet."—*Preface.*

Sir W. B. states that, excepting in one instance, the ships of the fleet enjoyed an exemption from fever during the Spring months, and early part of the Summer, the disease occurring in its epidemic state, either while the ship was in port refitting, or shortly afterwards. The exception was in his H. M. S. *Kent,* where the disease broke out while cruising off Toulon, *three months* after leaving harbour. It is towards the end of June, or beginning of July, that febrile affections present themselves; and the usual symptoms are head-ache, nausea, prostration of strength, suffused eyes, flushed countenance, tongue white and moist, thirst, skin variable, both as to temperature and perspiration. The same may be said of the pulse; but the bowels are generally costive, and the appetite impaired. These are the milder symptoms of the disease in Summer; but where the patient has committed excesses, or been exposed to the sun and night dews, it frequently assumes a severer aspect, resembling the autumnal fever of hot countries. At this time, gastric symptoms are seldom formidable, the head being the organ which principally suffers; the relief of which, and intestinal evacuations, are the paramount objects of the practitioner's care.

As the Summer advances, the disease is more dangerous. After a sense of lassitude and prostration of strength, a chilliness extending along the spine succeeds; and this is followed by considerable vascular action, accompanied by head-ache, deep-seated pain in the orbits, with sometimes a prominence of the eye-balls, which appear watery, inflamed, and impatient of the light. A flushing, and even tumefaction of the face, extending down towards the breast, are not unusual, with loaded tongue and bad taste in the mouth. Amongst the usual symptoms may also be enumerated, uneasiness in the epigastric region, nausea, bilious vomiting, pains in the joints and back, and constipation. The pulse is generally full and hard, sometimes oppressed, but rises under the lancet.—Partial perspirations are sometimes observable; but generally the skin is dry, and the temperature increased. Severe rigors sometimes, but not very commonly, precede the hot stage of the disease. In many cases, the disease makes a sudden impression, the patient dropping down in a state of insensibility, while at his usual work. In these cases, reaction soon takes place, with violent determination to the brain. " During the *Winter months,*" says Sir W. B. " the morbid affection of the brain is not, at all times, so prominent a symptom."—p. 6.

I have seen *intermittents,* and irregular remittents, the consequence of obstructed viscera, occur at this season; but if vegeto-animal miasmata be

the cause of " the bilious remittent," when aided by atmospherical heat, the Winter is an unusual time for such a disease.

Sir W. Burnett very justly remarks, that if the fever is not early combated, or if treated as a typhoid affection, the appearances will be very different. The head-ache will be accompanied by stupor, and an indifference to surrounding objects; the eyes will have a duller look than usual, or have a yellow tinge spreading, more or less, rapidly to the neck and body. The tongue will be covered with a thick yellow coat, while it is brown and dry in the middle. The prostration will be considerable; the anxiety and pain in the limbs great; the uneasiness in the epigastric region will be urgent, with bilious vomiting and harassing singultus.

" In the severe attacks," says he, " about the third day, there is often an appearance of complete remission, but the evening puts an end to the delusion; an exacerbation takes place, with great increase of all the dangerous symptoms. Unhappily, this deceitful period has often been mistaken for a real remission of the symptoms, and tonics and stimulants have been given, with a view to prevent the recurrence of the paroxysm; but vain, indeed, are all such efforts, they serve but to increase the malady."—p. 8. " As the disease advances, the pain and uneasiness about the *epigastric region* continue to increase; there is constant vomiting; considerable pain upon pressure, with restlessness and oppression at the præcordia. The abdomen is likewise painful, with frequently thin, black, fetid, and sometimes gelatinous stools. The suffusion, at first of a bright yellow, now assumes a darker hue," &c.—p. 9.

The symptoms which precede death in this fever, are pretty similar to those observable in the fevers of hotter countries, such as coffee-coloured vomiting, intolerable uneasiness in the epigastric region, hæmorrhages, subsultus tendinum, floccitatio, black encrusted tongue and teeth, sinking of the pulse, cold extremities, and finally death, which terminates the scene—" frequently on the third or fourth, but generally from the fifth to the eighth day; though, sometimes, death is protracted beyond that period."—p. 10. Sir W. Burnett, contrary to the observations of Cleghorn, asserts, that " in by far the greater number of cases, though there are even exacerbations, there is but seldom any evident and clear remission in the morning."

Under the head of " probable causes," Sir W. Burnett traces the influence of marsh miasmata in the fevers which prevail at Minorca, Malta, &c. with many interesting and sensible remarks on the topography of those places. Sir W. B. reiterates the sentiments of former writers on the *exciting* causes of this fever, namely, intemperance, exposure to the sun by day, and the dews by night. The young and plethoric are most subject to the disease, particularly the crews of boats, and ships' companies, who have shared much prize-money, and are permitted to spend it on shore."—p. 17.

Our author has not been able to detect the agency of contagion in its production, but rationally, we are sure, allows that " in the latter stages of this fever, where proper attention may not have been paid to personal cleanliness, to the removal of the excretions, and to ventilation, where the sick are crowded, the surrounding atmosphere may be vitiated."—ib.

Method of Cure.—Sir W. Burnett judiciously enough divides the disease into four stages. 1st. From the beginning till the commencement of gastric symptoms or yellow suffusion, a period of about three days. 2d. From this period till the appearance of nervous symptoms, the duration of which is various. 3d. From the accession of these last symptoms, marked by increased uneasiness in the epigastrium, ischuria, singultus, coffee-coloured vomiting, &c. till death or convalescence. 4th. From the commencement of convalescence till final recovery.

Our author but too truly observes that, in the first stage of the disease, the prostration of strength, watery eyes, anxiety, syncope on the abstraction of blood, &c. are well calculated to deceive the inexperienced observer.

" Bloodletting, both general and local, should be had recourse to, and repeated, according to the urgency of the symptoms: the benefit derived will be greatly increased by the use of purgatives and free ventilation. It will often happen, after a few ounces of blood have flowed, that syncope will be induced; this must not prevent the repetition of the bleeding, while the symptoms require it."—p. 20.

Sir W. B. with Dr. Irvine, prefers arteriotomy at the temples. " In the course of an hour, the bleeding may generally be repeated, and thirty or forty ounces may be taken away without producing syncope. In bleeding, the patient should be laid in a horizontal position."—ib.

The purgatives which Sir W. Burnett recommends, are those employed by Dr. Rush, namely, calomel and jalap. He justly remarks, that the oppressed pulse will rise under the lancet, and that an accession of strength is actually obtained by the loss of blood. " The great object, says Sir W. Burnett, is the removal of the local affection of the brain, or other organ, and the production of a complete remission of the febrile symptoms in the least possible time. In one instance, I ordered blood to be taken from the temporal artery, to the amount of ninety ounces in the course of six hours; he was convalescent in three days." If, notwithstanding all our efforts, the febrile symptoms should continue, Sir W. B. recommends in the evening, after a repetition, if necessary, of the bleeding, a pill composed of calomel and antimonial powder, each two grains, followed by a dose of liq. ammon. acetat. with cool drink, and the most strict antiphlogistic regimen. In a note at page 34, Sir W. B. states, that " it is but justice that I should add, that some surgeons thought benefit was derived from the use of calomel in the *first stage*, carried so far as to excite ptyalism."

After recommending decisive evacuations from the vascular system and the bowels, during the whole of the first stage, but condemning emetics, Sir W. B. proceeds to the second stage, premising, that much confidence must not be placed in cold and tepid affusions, excepting as auxiliaries to the above measures. In the second stage, he thinks, that where the symptoms indicate the necessity of venesection, it may still be resorted to, though in smaller quantities, and the blood is best drawn from the temporal artery. Blisters to the head, and daily evacuations from the bowels are here proper; but the cathartics should be of the less powerful kind, such as castor oil, assisted by enemas. The irritability of the stomach is to be allayed by the application of leeches, and the exhibition of saline draughts, in a state of effervescence, to which may be added, *small* doses of tinct. opii. The application of a large blister to the stomach has been also attended with success. In this stage, Sir W. B. speaks highly of the warm bath, and we entirely coincide with him.

In the third stage, "little more can be done than to look on, and endeavour to obviate occasional symptoms as they occur."—p. 29. As the pulse sinks, the stimuli must be increased; and Sir W. B. thinks, that he has seen much benefit from carbonate of ammonia and aromatic confection, in this dangerous state of the disease. We must take care, however, while we labour to restore the balance of the circulation, not to induce a state of secondary excitement, and thus exhaust the flame we were endeavouring to keep alive. Even here, constant attention must be paid to the bowels, and daily evacuations procured. Sir W. B. asserts, that the disease has seldom terminated in intermittent, under his own treatment; but frequently under that of others.

"It appeared to be, in general, occasioned by some morbid affection of the *brain,* liver, or other viscera."—p. 31.

In these cases, he recommends mercurials till the mouth becomes affected. In the fourth or convalescent stage, the only interesting remark relates to the care we should take, in guarding against a relapse from repletion. While noticing the different remedies which have, in their day, been celebrated in this fever, Sir W. B. asserts of cinchona, that, "under its use, mortality has been great, relapse frequent, and, as in the cases of the Temeraire and Invincible, dysentery attacked nearly all the patients who had had fever in a severe form; nor was there an instance, that, when given during a supposed remission of the symptoms, it prevented a return of the paroxysms."—p. 34.

On dissection, the vessels of the brain were generally found distended, and even gorged with blood, while the membranes were inflamed, and the ventricles contained serous effusions. In the thorax, the lungs and other parts were inflamed. In the abdomen, liver generally enlarged, frequently livid towards the lower edge of its concave side. Gall-bladder moderately

full of inspissated bile. Stomach, generally more or less inflamed, as also the intestines."—p. 37, et seq.

The cases and dissections occupy more than eighty pages of the first part of our Author's work. They more than prove the grand object of Sir W. Burnett, and of many judicious writers, who have laid the result of their experience before the public; namely, that the lancet must be boldly used in those fevers, and in those climates, where the dogmas of the schools and the timidity of practitioners, had nearly proscribed it. In this point of view, the accumulation of facts will firmly support the rising edifice of a more rational and successful mode of treatment than has formerly been employed, and Sir W. Burnett's work, therefore, entitles him to the thanks and esteem of the public.

The second part of the work opens with a sketch of the Author's observations and practice in the Mediterranean, while serving on board the Goliath, Diadem, Athenienne, and finally, as physician to the fleet. In the year 1799, a part of the Goliath's crew, that had been employed in watering the ship at Marsa Scala, in the Island of Malta, suffered an attack of bilious remittent fever, the prominent symptoms of which were nausea, vomiting, head-ache, flushed face, full and frequent pulse, thirst, white tongue, and, in most cases, delirium.

"The patients were liberally evacuated on their complaining, and the bleeding repeated according to the urgency of the symptoms; an open state of the bowels was preserved, and a mild diaphoresis kept up. Blisters were applied to the nape of the neck and forehead, and a strict antiphlogistic regimen pursued. This soon produced a cessation of the pyrexia, when tonics and well-regulated diet completed the cure."—p. 132.

In the succeeding year, forty of the Diadem's crew were similarly affected at Port Mahon, "and so speedily was a remission procured by the free use of the lancet, that I had only occasion to send two or three to the hospital." —p. 133. Sir W. B. here acknowledges that the use of emetics in a few of the first cases was highly prejudicial, a fact that will be experienced in the fevers of most warm climates. In this fever, small doses of calomel and antimonial powder were given with advantage, after liberal evacuations; and a simultaneous application of cold water to the head, and warm water to the lower extremities, was productive of beneficial effects, a circumstance that accords with our own experience in fevers of a similar type. In one case which proved fatal, Sir W. Burnett's assistant gave the patient an emetic of tartarized antimony, the consequence of which was, that "the vomiting increased, and never afterward for a moment left him; he passed blood by the nose, mouth, and anus, and finally died in the hospital."—p. 134.

Let this prove a lesson against emetics, in fevers of the warmer regions, where gastric irritability is one of the most formidable symptoms we have to encounter.

The Athenienne ship's company having been much exposed to the ardour of a Summer sun at Malta, while the vessel was docking and refitting there, was attacked with fever attended by great local determination, "but," says our Author, "by a proper use of the lancet in the *early stage*, joined to purgatives, they all speedily recovered."—p. 135.

Shortly after Sir W. Burnett was appointed physician to the fleet, in 1810, a fever broke out in the Achille, of 74 guns, at Cadiz, which was reported to the Admiral, "*to be the yellow fever of the West Indies*, and of a very malignant and infectious nature." This caused great alarm in the squadron; but Sir W. B. found that the symptoms were similar to those he had observed in the fevers of Mahon, &c. and that there was great determination to the thoracic viscera in particular. "Emetics, bark, camphor, wine, and opium were employed in the treatment of these patients," which Sir W. B. very properly ordered to be laid aside, since two deaths had already occurred; and "the lancet was had recourse to and used freely, and also purgatives; this soon produced a change in the features of this disease, and the whole, except one man, speedily recovered."—p. 136.

Sir W. Burnett arrived at Gibraltar in September, at which time the garrison was healthy. The thermometer ranged from 75 to 80°, and about the 18th or 19th, a deluge of rain fell, and continued three days, the torrents from the upper parts of the rock sweeping down great quantities of putrefying vegetable and animal substances, which lay stagnant with the water in many places where the outlets were not pervious. After this the weather became very warm with easterly winds. In the last three days of the month, 26 men belonging to the St. Juan guard-ship, were sent to the hospital with the bilious remittent fever, four of whom died, none of which had been bled. The general treatment was purgatives, calomel, blisters to the region of the stomach, and gentle diaphoretics. The cold affusion was also tried, and proved useful.

From Mahon Sir W. Burnett proceeded to Sicily, where he found that experience had already pointed out the necessity of evacuations when DEBILITY was the most prominent symptom, as is evinced in the communications from Dr. Ross, of the Warrior, and others. The army practitioners had, indeed, adopted the most decisive depletory measures among the troops in Sicily, previously to this period, as our readers know, from the writings of Irvine and Boyle; but in the navy it was only slowly introduced, and we believe Sir W. B. met with some difficulties, which, however, his zeal surmounted, in banishing from the minds of the medical gentlemen under his control, the phantom *debility*, and the delusive theories of the schools.

There is one circumstance which I have not yet noticed, though it has made a deep impression on my mind, namely, that throughout the descriptions which are given of this "bilious *remittent* fever," by Sir W. Burnett and his numerous correspondents, no mention whatever is made

of either diurnal or alternate *remissions;* excepting in the Temeraire and Invincible; and I cannot help expressing my suspicion, that a great proportion of the cases were fevers occasioned by atmospherical transitions and irregularities rather than by the application of vegeto-animal miasmata; and that, consequently, they were attended with more marked inflammatory symptoms, and assumed a less remittent type, than the fevers under whose denomination they are classed. Perhaps the term "bilious fever" (gastric irritability being so very general) would be more proper; and where the cause can be clearly traced to the operation of marsh miasmata, the epithet "remittent" might be properly added, because it is rare, indeed, that remissions on alternate days in particular, cannot be distinctly perceived. I have offered there suggestions, because I am of opinion that some modification of the practice detailed by the author, is necessary in the more fatal endemics of the warmer climates, where that wonderful and powerful morbific cause—"marsh miasma," attains a state of concentration unknown in Northern latitudes. In the Temeraire and Invincible, where the fever was evidently the bilious remittent of hot climates, the treatment was founded on the directions of Lind, Clark, and Balfour, whose works continue still to produce incalculable mischief in the hands of inexperienced practitioners. But the more rational and successful doctrines and practices which have lately been promulgated by judicious medical men, both in the army and navy, will dissipate ere long, the mists of prejudice, and annually save the lives of thousands of our countrymen. We have only to read the melancholy account of the fever in the two ships abovementioned, to be convinced of these truths.

"On making enquiry," says Sir W. B. "as to the method of treatment which had been pursued with those men, I found it to have been by the use of *emetics,* calomel, antimony, *bark and wine in large quantities,* with full meals of animal food from the beginning."—p. 158.

Those who did not fall immediate sacrifices, "were constantly relapsing; several as frequently as three times, most of them once, and some of them were daily attacked with dysentery."—p. 159. This was not all; for the visceral derangements induced by these protracted and repeated attacks incapacitated them in great numbers for the service of their country, and left them to drag out a miserable existence in indigence and disease!

I have hinted that certain modifications of the treatment pursued by our author would be necessary in the bilious remittent fevers of warmer climates, and the reason is obvious. Although in the Mediterranean the range of the thermometer equals, at certain seasons, the scale of tropical temperature, yet there is not that perennial ardor, which, in equatorial regions, keeps the functions of the liver in so deranged a state as to render that organ peculiarly predisposed to disease, when the balance of the circulation is violently disturbed, as in remittent and intermittent

fevers. On this account, liberal evacuations in the early stages of Mediterranean fevers, and slight tonics or bitters afterwards, are in general sufficient to conduct to a happy termination: whereas, in other and hotter regions, particularly in India, the use of *mercury*, in addition to the means alluded to, is absolutely requisite to secure the biliary organs from obstruction or abscess.

"In the Repulse," says Sir W. B. "Mr. Boyd reports that he had been very successful in combating it (the fever) by the early use of the lancet and purgatives; cold and tepid affusion he likewise found serviceable, as auxiliaries. In some cases, copious and sudden affusion produced a diminution of febrile heat, sweats, and a remission. In *several* of the patients, he mentions *calomel* as having had *very excellent effects*. In one case of *great danger*, benefit appeared to be derived from the inunction of *mercurial ointment* on the epigastric region."—p. 149.*

Mr. Allen, surgeon of the hospital at Malta, after describing the general symptoms of a fever which broke out on board the Pomone, and remarking, that "the *head and liver* seemed to be the principal viscera affected in this fever," goes on thus: "the Weazle sloop, refitting at the dock-yard, has also sent us ubout thirty, with similar symptoms to the Pomone's. Our method of treatment has been, in the first instance, by the abstraction of thirty ounces of blood, the exhibition of a cathartic, and a bolus composed of calomel and antimonial powder, of each two grains, twice a-day; the mist. salin. In the evening, the bleeding, if necessary, was repeated. Next day, if the symptoms required it, recourse was again had to abstraction of blood, a blister applied to the epigastric region, and the febrifuge medicines continued. I consider this fever to have been brought on by *intemperance and exposure to heat*, constituting the bilious or yellow fever of the island. It is not contagious."—p. 168.

In a subsequent fever, in the Weazle, Mr. Wardlaw, whom our author highly eulogises for his abilities, and whose statement consequently deserves attention, reports thus: "the state of the weather for these six weeks past has been extremely warm; the thermometer ranging from 80 to 87° in the shade. The Weazle arrived at Malta in the month of June, and went up to the dock-yard to refit; the ship's company were then perfectly healthy. Liberty being given to go on shore, and they having received a considerable share of prize-money, intemperance was the consequence; and next day, while very much debilitated, their duty necessarily exposed them to the heat of the sun. On the first attack, I took away from 20 to 30 ounces of blood, with saline draughts and cathartics, a bolus of calomel and antimonial powder, of each two grains, twice a-day,

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* See Dr. Denmark's Paper on the Mediterranean Fever in the Medico-Chirurgical Transactions, and Dr. Boyd's Paper on the Minorca Fever in a subsequent section.

till the mouth was slightly affected, generally completed the cure. The *liver and brain* seemed to be the only viscera affected; the liver from obstructed ducts, and the brain from the great determination of blood to it."—p. 170.

The remainder of the second part of Sir W. Burnett's work is occupied in sketching the fevers of different ships, and stating the reports of their surgeons on the method of treatment, which entirely corresponded with what I have detailed in the foregoing pages. Bleeding, purging, and the exhibition of mercury were the prominent items in the "*Methodus Medendi.*"

When the gates of Janus shall once more be thrown open, and the scourge of war (which Heaven avert!) be again suspended over the restless nations of the world, the medical officers of our fleets and armies will profit by the labours of the present race; and the bold energetic measures of modern practitioners in the West, in the East, and in the North, will be remembered and imitated, when the authors who practised and promulgated these tenets shall have mouldered in the dust!

COAST OF AFRICA.

I.—*A Practical Medico-historical Account of the Western Coast of Africa; embracing a Topographical Description of the Shores, Rivers, and Settlements, with the Causes, Symptoms, and Treatment of the Fevers and other Diseases of Western Africa.* By James Boyle, M.R.C.S. Colonial Surgeon to Sierra Leone, Surgeon R.N. &c.

[Analysis.]

It is not a little extraordinary, as Mr. Boyle remarks, that no work on the diseases of Africa should yet have emanated from the medical press of this country, so fertile in all kinds of publications on very inferior subjects. Yet Africa is the grave of Europeans, and especially of the English, beyond that of any other colony, in proportion to extent or population. Our travellers, medical and non-professional, have penetrated into the wilds of that barbarous and deadly quarter of the world—while our soldiers, sailors, and merchants have been swept from its pestilential shores by sickness and death; yet no medical work has been published on the nature of the diseases, or the means of guarding against them. But however destructive may be the climate of Africa, there is reason to believe that its terrors have been sometimes exaggerated, and that men of talents and acquirements, in whatever calling, have generally been intimidated from serving in that colony. Even those who have struggled strenuously to brave the dangers of the climate, have too often been hastened to the grave by the foreboding and anticipations of sickness or death.

It is hardly possible to give up intercourse with the African Coast, so extensive is our trade in gold dust, ivory, wax, hides, &c. besides timber of a valuable kind. It behoves us, therefore, to make the best of it, by lessening the mortality if possible.

Mr. Boyle had fair opportunities for observing the diseases of Western Africa, both at sea, and as colonial surgeon during five or six years there. The records, also, of our naval and military medical practitioners have been liberally laid open to him, by Sir James Macgrigor and Sir W. Burnett, from which documents the author has gleaned important information.

The work is divided into eight chapters, each embracing a distinct subject. The first chapter, occupying seventy pages of letter-press, is on the important subject of medical topography, and takes in a wide range, including the river Gambia, Sierra Leone, Bathurst Settlement, Rio Grande, &c. We shall only be able to give a few extracts from this highly-

interesting portion of the work. The first is from the medical topography of Bathurst Settlement, the most northern of the British establishments, and the chief on the river Gambia. It is situated on the small island of St. Mary, commanding the navigation of the river, but badly adapted for the preservation of health. It consists of barren sand and tenaceous mud, overgrown with jungle.

"The wet season is immediately preceded by tornadoes or thunder-storms, which, together with the harmattan, another wind peculiar to this coast, will be described under the head of Sierra Leone, as they are the most strongly felt at that settlement. The rains are tremendous, and swell the river so considerably, that, during their fall, almost the whole of the island is inundated. The part upon which the town is built escapes not, and but for the precaution taken in building the houses, many would be uninhabitable during this period. When the rains subside, and the river returns to its level, an immense deposit of vegeto-animal matter is left behind, the whole of which undergoes the process of decomposition, and, from being acted upon whilst in that state by the rays of an almost vertical sun, fills the air with noxious effluvia. This effluvia, combined with the remaining moisture and the high range of temperature, form the great cause of fever and of ague, which prevail during its existence to so lamentable an extent as to make this settlement appear a focus for those diseases, and the grave of Europeans." 6.

SIERRA LEONE.

This settlement, the principal one on the Western Coast of Africa, and about which we all have heard so much, is beautiful, or even romantic, to the eye, when first approached on a fine day; but deadly to the health, when taken up as a residence.

"There are very few parts in the tropical world, which, at first sight, hold out more allurements, even to the experienced traveller, than Sierra Leone. Its splendid scenery, and its beautiful river, together with its extensive, commodious, and generally secure harbour, and pleasant-looking town and villages, are calculated to excite the most flattering hopes in respect of health and enjoyment, notwithstanding strong previous impressions to the contrary. On making Sierra Leone from the north, the mountains from which the peninsula was named, first excite attention. They are lofty, perpetually clothed, from their summits to their bases, in all the fertile gaiety of nature's verdant and richest scenery; and there is a pleasing and endless variety in the outline of their countless peaks and declivities. As the ship draws in with the shore signs of civilization appear and increase with rapidity, both in number and attractiveness. Freetown and the lately-formed villages in its neighbourhood at first shew like anomalous patches in the view, but, on a nearer approach, they add greatly to its

beauty and its interest. When the ship has arrived just at that point of distance from which a person may see all the broad outlines and apparent characteristics of an extensive scene, without being able to discern the minute details, the effect is magnificent. On the left hand is the Bullom shore, low but covered with luxuriant and richly-coloured bush, an occasional palm and pullom tree, rising in graceful form above the neighbouring mangroves: in appearance it seems to embody the notions formed of fairy land, but its realities most sadly illustrate the folly of such dreams. The middle ground also occurs on the left hand, and it gives a variety to the view. In front are the spacious river (extending farther than the eye can reach), and the north side of the peninsula, with its lofty mountains and Freetown, running to the water's edge, and surmounted by barracks, and protected by a handsome fort, and a coast forming numerous small and convenient bays from the town to its termination at the cape, which runs boldly into the sea. On the right is the Atlantic. That a scene, composed of such ostensible material features, is grand and imposing, may readily be supposed; but those who are ignorant of the peculiarities of a tropical clime, and its seductive influences on a stranger, can form no adequate notion of the character and extent of its actual power. For the moment home is forgotten, or if remembered, the remembrance is accompanied with a desire it should be situated in such a seeming paradise. In thus speaking of the view on arriving at Sierra Leone, we are supposing that settlement to be made on a fine clear day, when the atmosphere is bright and comparatively devoid of malaria, and the river runs its natural course, unswollen and free from discolouration. Should the arrival, however, happen at a different period, when the atmosphere is dense, oppressive, and fraught with deleterious exhalations, and the rains are deluging the face of the country, and at once augmenting the river and destroying its beauty, then Sierra Leone presents a very different appearance; there is little or nothing to excite a pleasing anticipation, but there are a world of causes for apprehension and for dread. The realities of the scene are of course unaltered, for the two periods are the property of the climate, and must be alike endured by the colonist, but the appearances present a melancholy and fearful contrast." 25.

This settlement contains about 26,000 inhabitants, one-third of whom inhabit Freetown, the rest being distributed in the surrounding villages.

"The inhabitants of Freetown consist of Europeans, Maroons, Settlers or Nova Scotians, exiles from Barbadoes, discharged soldiers from the West India regiments, Mandingos, liberated Africans, and Kroo-men; while those of the villages consist almost exclusively of a very few Europeans (as the managers and most of the church missionaries), discharged soldiers, and liberated Africans." 30.

The Europeans are about 120 in number, and, with few exceptions, adult males; women and children are rarely met with, as they are unable to resist

the deleterious influence of the climate—at least in Freetown; for in the villages, which are more healthy, they stand a better chance. It appears from Mr. Boyle, that the influence of climate is augmented by the imprudent habits of the colonists. They are too frequently loose, careless, and dissipated.

"It would not be difficult to assign many other reasons for much of the suffering notoriously endured by Europeans in this settlement; but, after all, the great leading cause would be found to be the intrinsic quality of the climate of that region. Wholly and successfully to oppose that cause human ingenuity can hope to devise no adequate plan, but many suggestions might be offered calculated to meliorate its influence. It may be sufficient to remark in this place, that a moral life, freedom from fear, cheerfulness, moderate exercise, and particular care in avoiding the extremes of the atmosphere, are absolutely necessary to allow the English constitution in this climate a fair chance of sustaining life. To the practice of these auxiliaries to health, Sierra Leone offers no preventives; but on the contrary, many facilities, which are to be found in the construction of Freetown and in the mountains." 31.

Mr. Boyle gives an excellent description of the seasons of Sierra Leone, dividing them for convenience into the dry and the wet seasons. The dry commences about the end of September, its approach being usually announced by two or three tornadoes, which, though portentous in appearance, are hailed with joy by the inhabitants, as harbingers of health. We shall indulge our readers with a description of one of these elementary conflicts.

"A violent tornado appears to strangers a most appalling visitation, and produces an extraordinary effect upon their feelings. It consists of successive flashes of most vivid lightning, tremendous shocks of thunder rapidly and alarmingly reiterated, impetuous gusts of wind, and deluging rain. This terrific combination of the elements sweeps along the whole of the coast under consideration; but it occurs with peculiar violence, on what is called the windward coast, especially at Sierra Leone. Its denomination is derived from the Portuguese, it being a corruption of the word *Trovado*, which means thunder-storm. Its approach is first discernible by the appearance of a small, clear, silvery speck at a high altitude in the heavenly expanse, which increases and descends towards the horizon with a gradual and slow, but visible motion. In its descent it becomes circumscribed by a dark ring, which extends itself on every side, and as soon as the silvery cloud approaches the horizon veils it in impenetrable gloom. At that moment the elements seem to have ceased their operations, and the very functions of nature to be paralyzed; the atmosphere appears to be deprived of the spirit of vitality, and a sensation of approaching suffocation pervades and oppresses the physical system. The mind is wrapt in awe and suspense, but the latter is speedily relieved by the dark

horizon being suddenly illumined by one broad blaze of electric fluid; peals of distant thunder then break upon the ear and rapidly approach and increase in frequency and violence till the shocks become appalling; when the thunder is at its loudest a tremendous gust of wind rushes with incredible, and often irresistible vehemence from the darkened part of the horizon, not rarely in its course carrying away roofs of houses and chimney-tops, blowing down or up-rooting trees, and laying the stiffest and largest ships on their beam-ends, or sinking them, whether under-weigh or at anchor; and to that succeeds a furious deluge of rain, which falls in one vast sheet rather than in drops, and concludes this terrible convulsion." 41.

By this atmospheric commotion noxious exhalations, before confined to the neighbourhood of their sources, are swept away—the feelings are lightened—the weather becomes hot and clear—the inhabitants healthy. About Christmas the harmattans occur, and last for some weeks. They blow from the eastward. They impregnate the air with an impalpably fine sand, and one very annoying to the seasoned Europeans—more so than to those newly arrived. During these dry winds the furniture splits—fluids quickly evaporate. They induce coughs, colds, and a species of irregular intermittent fever among the old settlers. About the beginning of March a tornado usually ushers in the rainy season, which is at its acmé in July, and subsides in September.

Mr. Boyle winds up the medical topography of the African coast with a meteorological diary of every day in a whole year, by which it appears evident that the temperature of Sierra Leone and other parts is greater, upon the whole, than that of Madras or Calcutta, while the rains are more frequent, and the terrestrial circumstances not at all less unfavourable to health, than in either the Eastern or Western Hemisphere. The author concludes this portion of the work with some very judicious observations on hygiene, as applicable, in an especial manner, to Sierra Leone. It appears from Mr. Boyle that the greatest source of illness at the above-mentioned town is the Bullom swamp, situated in its vicinity. The author proposed some time ago, to Government, that a certain number of people, chiefly liberated African soldiers, should be located on that part of the swamp which is most contiguous to Freetown, in order to cultivate it, to plant it with trees, and thus to form a kind of defence against the malaria wafted by the winds to the capital of the colony. This corresponds with Italian hygiene, as may be seen in another part of our present number. We do not expect, however, that Government will attend much to matters of this sort under existing circumstances. It is too much occupied with matters of more vital importance. The colonists must look to themselves, as the colony of Great Britain itself was obliged to do, when the Roman Empire was threatened and environed with dangers at the centre!

It is unnecessary, as it would be painful, to adduce statistical proof of the baneful influence of the climate of Western Africa on European health.

This proof has been given in the Reports of Major Tulloch, which contain an unvarying record of death, equally extensive and rapid. In Sierra Leone, for instance, we find the annual deaths out of a thousand British soldiers to amount, on the average of eighteen years, to 483:—"every soldier was thrice under medical treatment, and nearly half the force perished annually: indeed in 1825, and again in 1826, when the mortality was at its height, three-fourths of the force were cut off." The Cape Coast Command yields the same harvest of death:—"two-thirds of the white troops died annually, and so great was the mortality in 1824, that the deaths nearly equalled the mean strength of the garrison."

The diseases which produce this terrible havoc are almost exclusively fever and dysentery, of so formidable a character as hitherto almost to defy the means of cure.

CHAPTER THE SECOND.

In this chapter, Mr. Boyle takes up the subject of the CLIMATORIAL, or BILIOUS REMITTENT FEVER. The author considers it of great importance to discriminate between the climatorial fever and the "African local bilious remittent fever," which discrimination, unfortunately, cannot always be made by *symptoms* alone. Various other circumstances, of an etiological nature, must be taken into consideration.

"Sol-lunar influence is powerful in the production of fever on the western coast of Africa, and indeed in all parts between the tropics. Many instances have been known of men, whilst at work under the rays of the sun, dropping down, as if shot; and that without any previous threatening symptom or habit of indiscretion; and also men, who, to avoid the closeness sometimes experienced in sleeping between decks, have slept on the upper deck, without the knowledge of the officer on watch, thus, exposing themselves to the apparently harmless beams of a brilliant moon, have often been known to be suddenly affected with fever. The rapidity of the latter attacks precludes the thought that they were attributable to damps or dews that might be falling in the night, and which, indeed, are also common causes of fever, but not so immediate in their consequences." 76.

Immoderate indulgence in ardent spirits is a predisposing cause of fever, and so is the opposite extreme—a sudden plan of abstinence through fear of the disease. Mr. B. avers that the absolute water-drinker is in as dangerous a predicament, when once seized with fever, as the absolute drunkard. We doubt this position. Where the fever occurs in situations abounding in filth, and badly ventilated, the disease, Mr. B. thinks, occa-

sionally assumes a contagious character, especially in ships. The following is the symptomatology of this form of fever on the coast of Africa.

"This fever is *ordinarily* characterized by severe headache, pain at the pit of the stomach, retching or vomiting, with a costive state of the bowels: sometimes vomiting of green bile, great heat of skin, suffused eyes, and thirst; the tongue being generally more or less furred; usually, also, pains in all the joints, and tottering of the limbs. The pulse varies from 90 strokes in a minute to 120 or 140. On minute inquiry it will generally be found that the patient is suffering from severe pain in the back or loins; and if the face do not happen to be flushed at the time, it will have a livid hue, its features having a downcast appearance, and there being, in all probability, a dark areola around the eyes. Under these latter circumstances the pulse will be less developed; nor will the skin attain to so high a temperature. Most attacks will be preceded by a sense of chilliness, and attended with loss of appetite: and, in all, the greater part of the symptoms described will soon set in, and establish the true character of the disorder." 78.

Sixteen minutely-detailed cases, from his own and several other medical officers' journals are given, in order to delineate all the various features of the fever. These will be found to be valuable references for the surgeon on the coast of Africa, when surrounded by fever cases.

Treatment.—From the cases alluded to it appears that, generally speaking, patients labouring under climatorial fever, on the coast of Africa, do not bear bleeding so well as in some other countries, and that the blood does not exhibit the usual inflammatory phenomena. Venesection must, therefore, Mr. B. thinks, be practised with precaution, especially when the local endemic fever is mixed with the common climatorial disease.

"Still the result of considerable experience upon the coast, directly and indirectly, is, that bloodletting, with the above precautions, in such cases as appear to have a perfectly simple origin, that is, such as are altogether independent of local exposure, is, when the symptoms indicate increased arterial action, the first measure for adoption; the effect produced regulating the quantity to be taken away. Increased vascular action being reduced, the next object is to cause a slightly increased flow of saliva, by means of mercury. The ordinary, and, indeed, the better mode of administering this medicine, in the form of disease now under consideration, is to give large doses of calomel at the commencement, by which the bowels will be freely, but not very frequently moved; and by which, also, the system will be the more readily brought under the influence of that medicine. The bowels thus evacuated, two grains of calomel, with one-eighth of a grain of opium, may be given every two hours, until slight salivation and a remission of the febrile symptoms shall have taken place; when one grain of blue-pill, and two of quinine, in the form of pill, may

be substituted, and repeated at the same intervals as that of the calomel and opium. After that, the blue-pill is to be gradually lessened, rather than suddenly withdrawn, as an abrupt cessation of salivation might be attended with fatal results.

" A slight flow of saliva having once taken place, it should be kept up for a few days without cessation; and when a perfect remission of the febrile symptoms has been established, the blue-pill is to be altogether withdrawn, and equal quantities of rhubarb and quinine (say two grains of each) are to be given thrice daily until convalescence shall have fully taken place. The patient, during the period of convalescence, must be somewhat restricted in food and drink, and that rather in quantity than kind; for, strange as it may appear, it is a fact, that a moderate indulgence in the gratification of a desire, on recovering from this fever, is much less injurious than a total denial of the patient's wishes.

" If the first abstraction of blood from the arm does not sufficiently subdue the febrile excitement, the local abstraction of blood, by means of cupping or leeches, from the seat of pain, may be adopted as the safest and most judicious practice; and if, after the use of that remedy, pain or mental aberration continue, or set in, the application of a blister to the neighbourhood of the affected part may, with propriety, be had recourse to. These measures are to be repeated according to the intensity of the disorder.

" If there be great sickness of stomach, medicine by the mouth will have but little effect until leeching or blistering, or both, shall have been practised over the region of that organ; and, that effected, an occasional drachm dose of soda, dissolved in plain water, will, in all probability, have a powerful effect in restraining the gastric derangement. At such a time, mercurial frictions, instead of the administration of mercury by the mouth, will be proper; and small occasional doses of camphor mixture, with tr. hyosciami, will contribute to quiet the stomach, to produce a diaphoresis, and to soothe the nervous system generally. If collapse take place, as occasionally happens in the advanced stages, ammonia should be added to the latter medicine; but, immediately re-action occurs from such combination, the ammonia is to be withdrawn, and quinine, in some form or other, to be administered. The camphor mixture, &c., may be continued, in order to keep up a certain action in the circulatory system. During the deranged state of the stomach alluded to, enemas will generally be found preferable to purgatives by the mouth; but when a purgative by the mouth is decided on, that should be calomel alone, followed by a magnesia draught. The quantity of calomel must, of course, depend on the object in view. If the intention be to purge and salivate, a large dose (a scruple, for instance), must be administered; but, if to purge with activity, without effecting salivation, be desired, then five or six grains, followed by a seidlitz powder, or two or three drachms of the phosphate of soda (tasteless salts, as they are commonly called), will best answer the purpose.

"As to bark, it is generally hurtful, if given in substance; indeed, it seems matter for surprise, how former writers and practitioners managed to get their patients to swallow some ounces of powdered bark in the course of the day. Modern stomachs would loathe or reject a few grains in such fever cases as have been under consideration.

"The warm bath is an important remedy in the commencement of the fever; but, after that period, it is a remedy of questionable efficacy, owing to the debility attendant upon its repeated employment, and the danger of the patient's catching cold, when the mental powers are, in all probability, aberrated, and the physical faculties in a state of extreme exhaustion. After the first employment of the bath, and when the fever is at its height, and the patient has a hot, dry skin, the regular application of cold affusion of vinegar and water to the palms of the hands and soles of the feet, those parts being always the most affected with heat and tingling, will be found alike grateful and beneficial.

"The use of antimonials of every description is to be deprecated, as they never fail to increase that irritability of stomach so commonly experienced, and so difficult of control, in this disorder.

"When the mouth is decidedly under the influence of mercury, the febrile action positively subdued, and nothing but debility to contend with, wine, at first in small quantities, may, with propriety, be given. The period for this indulgence will generally shew itself on the seventh, eighth, or ninth day. This is to be looked upon as a general rule, rather than as one without an exception; for it will sometimes happen, that unexpected collapse, and sinking of the pulse, will take place, and call for the temporary use of wine. In such case, good old Madeira seems to answer the purpose best; but it is to be borne in mind that, when re-action takes place under the administration of wine, or any other powerful stimulant, the stimulant is to be withdrawn, unless the patient shall have progressed to the state alluded to above, when its use may be continued with propriety." 117.

CHAP. III. THE ENDEMIC, OR LOCAL BILIOUS REMITTENT FEVER.

This disease rarely fails to attack the British settler on the Western coast of Africa. It closely resembles the climatorial fever, and is often mistaken for it by the inexperienced practitioner. It requires a different mode of treatment. Mr. Boyle is convinced, from ample experience, that all persons from cold countries "are predisposed or liable, one day or other, to the African local bilious remittent fever," whilst southern subjects, or those of warm climates, are almost entirely exempt from the scourge. The Dutch and Swedes appear to suffer more than those of other European countries as to numbers.

When the rains commence, say at Sierra Leone, the face of Nature

quickly changes, and the parched soil teems with vegetation. The inhabitants are soon surrounded by scenery that is alike alluring to the eye and calculated to the rapid diffusion of sickness and death.

"The greater portion, indeed, of the mountainous ridges around Freetown, that is, on the Freetown side, is still covered with bush, and the wreck occasioned by the violence of the tornadoes and the progress of nature, is washed by the deluging showers from the heights down to the bottom, close to the town, where it forms an immense mass of gradually decaying vegetable matter, which continues to disseminate its fatal odours until the setting in of the very heavy rains. When that period arrives, the sun being obscured, the inordinate heat of the surface of the earth is so generally reduced, that evaporation ceases; and the streams resulting from the rains, sweep with so much power that they bear away the vegeto-animal matter, which had previously been collected, and was in a state of decomposition and putridity, or so lessen its quantity and dilute or destroy its pernicious qualities, that its baleful influence subsides, and no fresh fever cases then appear. This temporary immunity from disease and death is again broken in upon at the approach of the dry season, when, as at the commencement of the rains, the light showers of short duration are disproportionate to the rapidly increasing intensity of the sun; the earth in consequence becomes again heated, and evaporation once more attains its zenith." 126.

The symptoms of the endemic fever are so various and irregular in different cases and under different circumstances, that no concise nosological definition of it can be given; we must therefore make room for Mr. Boyle's more detailed delineation of its symptomatology.

"The first attack of fever, as it is ordinarily observed to occur in the persons of strangers, such generally as are but a short time resident in the colony, although it does not always happen within the first few months, or even the first few years of residence, is characterized by a general decline of natural activity and mental energy; and these symptoms may continue their progress during three, four, or more days, according to the peculiarities of the constitution of the subject attacked, state of the body at the time, and the degree of exposure endured. The disease then begins to unmask itself, either by pains in the limbs, loins, or head, which are not unfrequently accompanied by bilious vomiting; and very soon after, if not at the same time, heat of skin, with a frequent pulse, and a tongue more or less furred, complete the development of the more common symptoms, and remove all doubt as to the existence of the alarming malady. The condition of the bowels forms no criterion by which to judge of the presence or absence of this fever; for they are described by patients, at the onset of the disease, to be in a state that is natural nearly as often as in that of the opposite extremes of costiveness or relaxation. Nor is the skin, except as to its temperature, always to be depended upon as a decisive

circumstance on which to determine with respect to the existence of this fever, as the surface of the body is as frequently found to be in a state of copious perspiration as in that of the unpromising converse of dryness and constriction. The pulse, too, though generally more or less above the natural range, is, in other respects, as variable as the winds; it being, in different cases, sometimes hard, yet small, and as it were contracted; at other times, soft, fluttering, or stridulously undulating; and as often regular as irregular, in respect to the intervals between the sensations of its action, as communicated to the fingers and thence to the mind that examines and judges of its state. In some rare cases the pulse is full and bounding. In the latter case a suffused and inflamed appearance of the eyes is generally seen, and the eye-balls, or the lower portion of the forehead, immediately over the orbits, will be complained of as painful; or, if not, minute interrogation will almost always lead to the detection of some fixed or general pain in the head, or to some sensation of weight or confusion in that organ; and, under such circumstances, a strong disposition to sleep will not unfrequently be superadded, attended with sudden starting and an unconquerable degree of restlessness, which effectually prevent indulgence or gratification in the desire. When the pulse, on the contrary, is less developed, the symptoms just described will be either less marked or altogether wanting. In that case pain will be more likely to be referred to the larger joints of the extremities, or to the lumbar portion of the spine, and perhaps to both of these. Occasionally patients are met with, who, though apparently in full possession of all their perceptive faculties, declare they have no pain whatever, expressing themselves as being merely inconvenienced by an indescribable sensation of general *malaise*.

" The febrile symptoms are very frequently ushered in by a slight paroxysm, or shivering fit, similar to that of intermittent fever; but which rarely returns during the future progress of the disorder.

" Accompanying the premonitory symptoms detailed, yellowness of the skin and eyes, sometimes, also appears; and this state, when it does appear, is almost always attended with vomiting of green bile, which seldom varies its colour, except as to tint, that being at one time a light, at others, a dark, or bottle green: and in such particular case the early alvine evacuations, at least the evacuations which are procured from the lower bowels, will scarcely ever fail to exhibit a very dark tar-like appearance, and to emit a most offensive odour.

" The disease once in march, gradually increases in intensity till it arrives at its critical acmé, which it seldom attains before the eighth, ninth, or tenth day of its duration. In its course many changes are wont to take place; and two attendant circumstances may be especially noticed as being tolerably uniform in their occurrence, namely, a better and a worse day, alternately; and a daily exacerbation, which usually commences at about

three or four o'clock in the afternoon, and continuing more or less severe all night, ordinarily effects a slow and partial retreat towards the following morning. At this period of the disease the patient will most probably express himself free from pain or suffering, but be greatly fatigued by delirious, or, it may be said, waking dreams, during the previous ten or twelve hours of nervous excitement and mental disturbance. When the patient enjoys this partial respite, he will often recount his fancied adventures, which are never agreeable, but full of apprehension and alarm, and frequently such as, having been attacked by some infuriated animal; exposure to the fire of a whole army; tumbling down the most dreadful precipices; being in the act of drowning; or about to be tried for his life. In this hallucinated state of the mind, great restlessness is to be observed; the patient constantly shifting his position in bed, whilst, with his visions still before him, he is complaining, perhaps, of being so firmly bound down that he is unable to move. At times resistance is offered to supposed restraint, and, if not promptly opposed, the patient, maddening under his delusion, will certainly escape from his bed, and, in all probability, dash his way through a window into the streets, or on to a housetop, or into a back yard, from either of which situations he will frequently extricate himself in a most extraordinary and dexterous manner. This is an extremely dangerous symptom; it may be said to be almost indicative of certain death. When such an escape has been once effected, or attempted, a repetition of the effort is to be apprehended, and should be well guarded against. The cunning of the patient is remarkable; for, in the midst of his suffering, his eye is often observed to be fixed on the countenance of the fatigued and dozing nurse, in the hope of detecting her asleep, and of thus finding an opportunity for withdrawing himself from what he considers to be forcible confinement. In such a state of mind no reference will be made by the patient to pain or bodily suffering; and his answers to questions, on the subject of his feelings, will almost always be, that there is nothing to be complained of but the annoyance arising from cruelty and unkind treatment, which he supposes to be in exercise towards him. Even at this period, within a few hours probably of his dissolution, the patient may be possessed of much physical power, and exert it for a moment, as it were, in a conflict for life. The paroxysm, however, is of brief duration, and is speedily followed by the setting in of symptoms that are unerring in the fatality of their character. The symptoms which immediately precede dissolution, consist of low incoherent muttering, delirium, or perfect calm, scratching at the bed-clothes, or grasping at ideal things, with *subsultus tendinum;* very frequently, also, involuntary discharges of urine and fæces, attended with lead-cold extremities and hiccup." 131.

Mr. Boyle found out by experience that people labouring under apparently the same symptoms and of similar constitutions, did not bear vene-

section on the coast of Africa, by any means so well as in either the East or West Indies. The introduction of a couple of cases, one successful, the other fatal, will sufficiently illustrate the practice pursued by Mr. Boyle in the endemic of Sierra Leone.

"*Case* 1, *from my own Journal, as Colonial Surgeon of Sierra Leone.* William Wilson, a seaman, aged about 25, a well-formed man, of middle stature, was, this morning (17th January, 1828), brought from one of the timber ships up the river; he stated that, the preceding day, he was affected by giddiness and nausea, accompanied by severe pain in the loins, and tottering in the limbs; pulse full and frequent, but not particularly hard; slight redness about the eyes; tongue covered with a yellowish fur; skin in a state of partial perspiration, with great restlessness. The patient's bowels have been moved since his arrival on shore, and he has just vomited a large quantity of yellow bile. He complains now of extremely painful headache; this last supposed to depend upon the vomiting.—A scruple of calomel immediately; and two grains of the same to be continued every two hours after, in the form of pill; the hair to be cut close from the head, which, in addition to the whole surface of the body, when at a temperature above that of the natural standard, and not perspiring, is to be sponged with vinegar and cold water.—At six P. M. eight hours after the first visit, the patient had been greatly purged, but the vomiting and headache were increased; the state of restlessness extremely distressing, with a very hot, dry, and a constricted skin.—Thirty leeches to the forehead and temples, followed by a warm bath, and the application of a blister over the region of the stomach; the two-gr. calomel doses to be each combined with six of calcined magnesia. A little barley-water, gruel, or thin arrow-root, only to be occasionally taken, and that in very small quantities at a time,

"18th. Headache gone, but no sleep; vomiting lessened, but not subdued; frequency of pulse and heat of skin greatly reduced.—Saline effervescent draughts occasionally throughout the day; the powders to be continued.

"19th. Considerable reduction of the febrile symptoms, but still no sleep; and the draughts and powders are rejected as fast as they are taken.—The powders to be omitted altogether: and, in order to avoid distending the stomach with air, the violence of the effervescence to be permitted to subside previously to swallowing the draughts, which are to be continued. A drachm of mercurial ointment to be rubbed in on the inner side of the thigh every two hours.

"20th. Very restless and anxious; had very short slumbers throughout the night, with frightful dreams; skin still less intensely hot; pulse 88, small and not hard; tongue loaded, but moist; no alvine evacuation since yesterday evening; added to which, pressure over the lower bowels

produces slight pain.—A Seidlitz powder immediately, to be followed by the administration of a mild purgative enema. Mouth not sore.—The mercurial frictions to be continued, and the blister to be dressed with blue ointment.

" 21st. The patient greatly relieved by the remedies of yesterday; had some sound sleep in the night, but still no appearance of salivation.—Arrow-root, fowl broth, &c. and the other measures to be continued.

" 22nd. Expresses himself perfectly well, but weak; pulse and skin natural; tongue very much loaded; mouth apparently touched, but no saliva: the countenance is demonstrative of much stupor; the whole body, in fact, appears torpid; no stool since yesterday morning.—A large blister to be placed over the cervical vertebræ, extending from between the tips of the shoulders to the commencement of the occiput, and a scruple of calomel to be taken immediately; the ointment to be rubbed in every hour.

" 23rd. The patient decidedly better; complains of pains from his blister, and his mouth, which latter emits a strong mercurial odour, but saliva does not yet escape from it.—The stomach being again free from irritation, and the system apparently on the very eve of being satisfactorily brought under the mercurial influence, the ointment was left off entirely, and the following medicine directed to be administered every two hours; viz. calomel, one grain; sulphate of quinine, two grains; with six grains of calcined magnesia.

" 24th. The patient having had a good night, complained only of weakness and irritation, from the state of the mouth and the blistered surface.—To discontinue the powders, and take decoction of bark, with ten grains of sulphate of quinine to each pint of the former. This, together with astringent gargles and occasional mild purgatives, to be continued until recovery of strength.

" These means completed the cure, and the patient, perfectly recovered, soon after returned to his vessel.—This, from the first, was a well-marked case of Sierra Leone fever.

" *Case* 2, *from the same Journal.*—John Bogue, ætatis 34—admitted on the 19th Jan. 1828. Complains only of weakness and sickness of stomach; had been suffering, during several days on board, from frequent vomiting of green bile. Bowels tolerably free, from the operation of a purgative taken previously to leaving the ship. Pulse now frequent, but weak and tremulous; skin hot, but covered with perspiration; tongue very foul; eyes suffused; no headache; no pain whatever.—Subm. hyd. ℈j. Opii gr. j. M. divid. in pil. No. iij. statim sumend.

" 20th. Had been purged slightly in the night; had no sleep; bowels rather irritable; very little other perceptible alteration.—Infus. sennæ, Aq. amon. acet. āā ℥ss., Sulphas. mag. ℥ij. M. statim sumend. postea, Subm. hyd. ℈j., Opii gr. j. M. ft. pil. No. x. unam quaque secunda hora.

" 21st. Complains of pain on pressure over the region of the stomach. A scruple of the submuriate of mercury to be taken immediately, and a large blister to be applied to the affected part.

" 22nd. Extremely restless and anxious, although the bowels are open and pain is not to be detected, either by examining or questioning the patient; still perfectly rational.—One drachm of mercurial ointment to be rubbed in every two hours; continuing the pills and the other usual auxiliaries in the way of drink, the occasional application of cold affusion, &c.

" 23rd. No improvement of symptoms; on the contrary, the pulse is irregular, and communicates a kind of continuous second stroke; a tremulous thrill hanging, as it were, and returning upon the retiring pulsation: tongue black, dry and contracted, and almost motionless; no stool since yesterday morning; slight nausea, but no vomiting, except immediately after over-indulgence in the beverage directed for his common drink.—A purgative enema to be thrown up immediately, and the medicine to be continued as directed yesterday.

" 24th. The patient's bowels open; he had some sleep in the night, but the countenance is greatly altered for the worse: his pulse is very small; he is in a state of stupor, and troubled with hiccough; gums swelled and red, but no saliva flowing.—To omit the mercury altogether; a large blister to the nape of the neck, and to take a third of a wine-glassful of the following mixture every half-hour:—Mistura camphoræ, ℔ss., Ammon. carbonat. gr. x., Ether. sulphuric. ʒij. M.

" 25th. Rallied considerably in the course of yesterday, but is now apparently lost to every thing around him, although the pulse is fuller and softer than it has been for the two or three previous days.—Bottles of hot water to the soles of the feet, which are now somewhat beneath the natural standard, and mustard cataplasms to the calves of the legs; all of no avail; the unfortunate man sunk in the course of the day.

" *Dissection.*—Cadavre not much emaciated: on laying open the thorax its contents were found to be perfectly healthy, with the exception of old adhesions of the pleura pulmonalis and pleura costalis. On making the usual sections and reflecting back the abdominal parietes in the ordinary manner, the omentum being withdrawn, the whole external aspect of the viscera, *in situ*, had a pale blanched appearance. On laying open the stomach, it was found to be perfectly healthy, containing nothing but a little flocculent mucus, mixed with part of the medicine last prescribed. Liver healthy; gall-bladder distended with dark-green viscid bile; ducts pervious. Spleen enlarged and easily broken down under the fingers. There was not the slightest appearance of inflammation in any part of the intestines: the duodenum alone contained some of the same kind of mucous matter noticed in the stomach.

" It is also to be recollected, in reference to the morbid condition of the

parts examined, that the patient was some days ill previous to his having been under medical treatment, thus rendering the appearances after death the more extraordinary." 141.

In addition to cases from his own experience, Mr. Boyle introduces extracts from the journals and reports of various medical officers, who have served on the coast of Africa, and which will furnish valuable documents for those who are doomed to exercise their talents in the same field.

The fourth chapter treats of the "irregular bilious fever" in a very able manner.

The fifth chapter embraces some important subjects—namely, the fatal epidemics which ravaged Sierra Leone in 1823 and 1829. We wish we could afford space for a full analysis of this interesting chapter, as it would afford materials for curious reflection at the present time. The epidemic of 1829 caused discussions similar to those which arose out of the celebrated Bulam fever of Dr. Chisholm, though on a smaller scale. The following short extract will convey some idea of this epidemic.

"The general character and symptoms of the epidemic fever bear so strong a similarity to those of the endemic fever, that it seems to be only necessary to refer to the description of the latter; and, in addition, to notice separately such points as are peculiar to the former.

"The epidemic is more unsparing in its attacks, and more fatal in its consequences, than is the endemic; and, in fact, no climatorial seasoning gives security against its assaults; and no practice, hitherto discovered and pursued, has been generally successful in repelling them. It nevertheless, however, so much resembles the endemic in general character, that a broad and vague notion of its qualities may best be formed by supposing those of the endemic greatly aggravated.

"With respect to the symptoms, it may be remarked that, as in the endemic fever, there will generally be pyrexia, but rarely so marked or developed, and it will sometimes advance with so insidious a march, as not to attract the particular attention of either the patient or medical attendant. In most cases the action of the pulse will be quickened, and the temperature of the surface elevated, but it will frequently happen that the patient is first seen in a state of collapse, to which re-action never succeeds. Sometimes pain in the head will be complained of as being very severe; but more frequently, however, it will be very slight, and not unfrequently altogether absent. Occasionally great giddiness will prevail. There will almost always be pains of the back, loins, or limbs, with pain in the chest, extending along the course of the *œsophagus*, from its commencement even to the stomach; and this pain will be said to be of a burning description. The state of the tongue varies greatly, it being at one time hard and dry, like a chip, and of a dark brown colour; the patient being unable to articulate for want of saliva. At other times the tongue will have a white centre, with edges of a bright red; and, still more commonly, in the worst

cases, the tongue will be altogether without fur, and of a deep blood-red colour, and either very much enlarged and sponge-like, or elongated and contracted at the tip. There is generally thirst and a desire for cold liquids. The bowels are, for the most part, deranged; sometimes constipated, and sometimes, on the other hand, there is slight purging, attended with griping or tenesmus. The red appearance of the tongue, and the pains of chest, back loins, or lower extremities, may be considered as the truest characteristics of the existence of the disorder." 203.

It is not a little remarkable that a grand jury of tradesmen was set up in June, 1829, to investigate the remote cause of the epidemic, and its mode of propagation!! This jury, after mature deliberation, no doubt, came to the following conclusions—1st, that the then unhealthy state of Freetown was to be attributed to the landing of slaves from prize-ships in the centre of the town—secondly, to dead horses and cattle thrown into the water—and, thirdly, to the existence of certain slaughter-houses too near high water mark. All these allegations are denied by Mr. Boyle; but his refutation of them need not detain us here. The opinions of the grand jury died quickly away in consequence of a new idea being started, which occupied the attention of all classes. This was the importation of the epidemic through the medium of His Majesty's ship Eden. It was ascertained that previously to the Eden's arrival in Sierra Leone, the only complaints which prevailed in that vessel, were diarrhœa. But she was found to be rather dirty, and the medical examination considered that she brought the seeds of the fever which broke out in her at Freetown, from Fernando Po. Other sources of the epidemic were now searched for and found in certain schooners or slavers that had arrived in the colony about the time the epidemic broke out. A full investigation proved that no other complaint prevailed in these slavers besides *ulcers!* But we cannot follow our author through all the absurd creeds of importation which prevailed in Sierra Leone at the above period. One would suppose that the colony in question ought to be the last in the world to accuse other countries of exporting diseases into that quarter! We cannot resist, however, the introduction of a document drawn up by a mixed commission, partly civil and partly medical, sent to the Bullom shore, to ascertain whether the epidemic of Sierra Leone was confined to that port alone.

"*Narrative of a Visit made to the Bullom Country for the purpose of acquiring Information respecting the Epidemic Fever of* 1829.

"Apprehensive that political motives, in regard to the character of the country, and with respect to the effect which might be produced on their trade, might induce the natives to hesitate to make us acquainted with all they knew, we took with us a few trifling presents for the purpose of rewarding truth. Thus furnished, we proceeded, at an early hour, on the

morning of the 26th of July, to Dalla Moodie's residence, which is situated in a native town, named Medina, and is distant from Freetown about nine miles. On explaining the object of our visit, the chief expressed his readiness to give us all the intelligence he possessed, and we soon proceeded to business. Several messengers from the interior were with Dalla Moodie at the time, and we had speedily the satisfaction of finding that there was no lack of the information sought for. In order to facilitate our inquiries, we took with us a chart. Dalla Moodie soon shewed that he understood the relative situations of the four quarters of the globe; and, with the assistance of that knowledge, he rendered clear and comprehensive his explanations of places and local situations, and all such matters. When his recollection failed, he referred to manuscript writings in Arabic, and to persons around him from the interior. In describing his communications, no attempt will be made to adhere to his particular language, but the facts detailed will be faithfully conveyed. The information with which he furnished us was to the following effect :—

'In cutting the last crop of rice in November and December, 1828, the usual heavy tornadoes, which generally blow with great force at that season in the north-easterly direction, did not prevail. This circumstance was noticed by the natives generally; who, on the absence of those winds, at the periods above stated, always apprehend that the ensuing season will be particularly unhealthy. During the prevalence of the harmattan winds the air is impregnated, in a considerable degree, with an impalpable sand; and, after their cessation, the leaves of trees, &c. are found covered with it. These leaves are ordinarily cleared of the sand by the succeeding tornadoes, which set in about the month of April; but if the latter are not sufficiently strong, the sand, previously so deposited, remains; and this circumstance, whenever it occurs, is universally acknowledged, amongst the natives, as a certain sign that the following season will be unhealthy. This particular omen was observed by the surrounding people this year, who, in each town, consistently with their accustomed habits on such threatening occasions, contributed, according to the means of the respective individuals, a sum, or rather goods equal to a certain amount, for alleviating the anticipated necessities of their poorer brethren.

'After cutting the rice, the stubble is always left on the ground, and, of course, becomes gradually decomposed, and emits more or less extensive exhalations of vegetable *malaria;* for the grain (the rice) is generally grown in low swampy situations. The ordinary, and, indeed, necessary consequence of this occurrence is sufficiently injurious, but it was greatly aggravated this year by premature setting in of the tornadoes, and the unusually early fall of frequent showers of rain. This irregularity in the seasons, in addition to increasing the usual malaria, did not allow sufficient time for burning the bush which had been cut down on large tracks of land, for the purpose of their being sown with rice; and the bush, being left exposed

to the atmosphere and the weather, the natural consequence was, that it soon became so many masses of putrid vegetable matter, constantly emitting the most noxious and fatal exhalations, which were generated by the sun and partial rains, and dispersed according to the frequency and violence of the tornadoes. The natives thus accounted for the extent and fatality of the disease; and their reasoning appears to be convincing.'

'The sickness, with which the colony of Sierra Leone and the surrounding country have been so fatally afflicted, first made its appearance in Sangarrah, a country in the interior, about thirty days' journey, in a north-east direction from Medina, the residence of Dalla Moodie. The fever broke out at Sangarrah about Christmas, 1828, and more chiefs have suffered from it there within a few months than were ever before recollected to have suffered, from a similar cause, in as many years. Sangarrah is a low marshy country, covered with jungle. Bantoe, lying to the south-west of Sangarrah, is also said to have suffered exceedingly. Out of twelve men sent out in March to hunt elephants, only one returned alive, the others having died in the forests from the effects of the unhealthy condition of the atmosphere. Between Sangarrah and Foutah Jallon, whole villages have been nearly depopulated.

'From Laheer, and down through the Mandingo country, travelling in a south-west course to Fouricaria and Mellacoree, the number of chiefs that have died is unprecedented; and amongst the people generally, the loss has been immense. Much sickness prevailed in the Foulah country; but, owing to its being better cultivated, and composed more of hill and valley, it has not suffered to so great an extent as Sangarrah, where the fever broke out.

'The symptoms at the commencement of the attack were, a sensation of cold, followed by pains in the chest and region of the stomach, and sickness, with occasional vomiting; pains in the head and back, attended with loss of appetite. Matter ejected by vomiting was sometimes yellow and sometimes black. Hot skin and great thirst; state of tongue not known; no sleep; delirium and sudden starting. Fires were much used in the houses, and, as the natives believe, with great advantage. To promote perspiration appears to have been a great object. Cathartics freely administered. No other treatment for the purpose of cure was very clearly expressed, except with reference to the restoration of strength.

'The number of inhabitants at the village of Yongroo, in the neighbourhood of Medina, was not accurately known; but Dalla Moodie was himself aware of four deaths having occurred there. His own town, Medina, was, and has been healthy.'

"Such was the result of the visit to the Bullom Shore; and, from further and rather extensive inquiries of the natives from various parts of the main land, it was fully ascertained, that a fatal epidemic fever had prevailed to great extent in the following countries amongst their respective tribes—namely, Bullom, Porto Logo, Rokelle, Scarcies, Mellacoree and Foulah.

Those from whom these statements were obtained, were unanimous in the opinion, that the disease proceeded from the eastward, or agreeably with their own account, from where the sun rises.

'From all the descriptions given, and the facts obtained, relative to the comparative mortality in the vicinity of the colony, it appears that it was greatest in the neighbourhood of Porto Logo, and down to the swampy tongue of land which separates Porto Logo from the small Scarcies; thence along the bank of the large and small Scarcies,* and across the country to Mellacoree and Forecarreah. The banks of the large Scarcies and of the Mellacoree, in particular, are much intersected with creeks lined with mangroves, and generally ending in swamps, which are always overflowed in the rains; and, after their departure, emit the most offensive and most unhealthy odour.

'If the people from any of the countries named were asked what the sick persons complained of, they replied, of fever—'his skin hurt him, his head hurt him,' and 'his middle (his back and loins) hurt him.' Some supposed the disease was originated by witchcraft; the witch causing a poisonous atmosphere, the atmosphere still the immediate promoter, to rise out of the ground and to act on those whom she disliked.

'From messengers from Timbo, in the beginning of August, it was ascertained that an epidemic prevailed there twelve months previously to that date, and that it had then ceased only four months. The complaint was described by these people as being attended with pains in the head, back, and loins, with a hot skin and black tongue. In the advanced stage of the complaint the gums and tongue exhibited the colour of blood; and, it was added, that some threw up a black fluid like a mixture of powder.

'The Timbo people believed the sickness took its origin in the attempt at clearing a swamp in the neighbourhood of Timbuctoo, and that it thence spread to Jenni, from Jenni to Foota Tauro, and thence to Footah Jallon. It was also understood to have spread in the neighbourhood of Tamasso, Tambacca, and Kissy Kissy.'

"The foregoing information appears to be so conclusive, as to the origin and original nature of the disease, that further discussion upon those points must be unnecessary. That there are differences in the accounts given by the natives is true, but they do not amount to discrepancies of such a magnitude, as at all to invalidate or shake the one leading supposition and conviction—that the epidemic fever, which raged so fatally in Freetown in 1829, was immediately caused by peculiarities in the seasons—originated in the interior—was borne to Freetown by

* "It is important here to remind the reader it was at the Scarcies that the second and third cases of epidemic were contracted, which occurred on the 4th and 9th of May in Freetown."

the north-east winds—and, in its primary and true character, was not contagious." 258.

The good folks of Freetown, however, from the Governor (Major Rickets) downwards, became panic-stricken, and "sauve qui peut," was the order of the day, notwithstanding the official opinions of all the medical officers of the colony that the epidemic was non-contagious!

"That great apprehensions of contagion prevailed, and that personal safety was much consulted, is beyond all question; and the attempt made to stay the fear was unfortunately ineffectual. The facts are, that, soon after the publication of the above medical opinions, the two army medical officers were reported sick; fever cases became more general; a few individuals retired from the colony; the Governor went to the military barracks; and many of the inhabitants laboured under the dangerous influence of a prevailing panic. Mis-statements went abroad respecting the state of the gaol; in consequence of which, the then Chief Justice declined to hold the sittings of Quarter Sessions in the Court-house situate over that establishment, and exhorted the Grand Jury, in a public speech, not to enter the gaol without each juryman being supplied with a bottle of chlorate of lime, which, in procession, they were to sprinkle in all directions.

"In this state of circumstances it became no easy matter to brave the besetting difficulties amongst a deserted and consequently disheartened community; for, as it is with soldiers in the field of battle, so is it with the subjects of a community when surrounded by sickness; they will quail, fly, or sink in despair, if the chief absent himself from his post." 268.

With this curious extract we must close our imperfect notice of this valuable volume. To all army and navy surgeons, who may be destined to visit tropical climates generally, and the African Coast in particular, Mr. Boyle's volume is absolutely indispensable. And, indeed, we strongly recommend it to the perusal of our brethren in all countries.

WESTERN HEMISPHERE.

On Yellow Fever.

The disease which I am now to consider has no common claims to the attention of the medical philosopher.—The extent and frequency of its epidemical visitations;—its fatal tendency and rapid career;—and the merciless selection of the more robust and healthy as its legitimate prey,—are circumstances in the history of Yellow Fever, which cannot fail to command a deep feeling of interest in the investigation of its origin and nature.

Much light has, of late years, been thrown on this subject by the contributions of various practitioners in the public service, who have meritoriously employed a portion of their retirement subsequent to the war, in giving to the world the sum of their observation and experience. It is to be regretted, however, that an increased familiarity with the scenes of woe has not produced a corresponding unison of sentiment in regard to the etiology of the disease from which those events have sprung:—It may even be said, that no question in medical science has been more keenly agitated than that of the contagious or non-contagious origin of the yellow fever. The discussion of this point will be brought forward hereafter. Omitting the names of the older writers, I shall here confine myself to a brief enumeration of the principal of those who have subsequently published their opinions in favour of, or in opposition to, the doctrine of contagion, without, however, aiming at giving a complete list, or of being scrupulously exact as to the priority of their respective publications. In favour of the contagious nature of yellow fever, we have the authority of Lind, Blane, William Wright, Chisholm, W. Currie, Thomas, Pugnet, Bally, Gonzales, Pym and Fellowes. On the other hand, in the list of authorities who consider it as not contagious, are included the names of Hunter, Jackson, Moseley, Rush, Miller, Bancroft, Lempriere, Devèze, Saverésy, Valentin, Dickson, M'Arthur, Burnett, Doughty, Veitch, Fergusson, Dickinson, Mortimer, Sheppard, Robertson, &c. It will be seen that, numerically, the advantage is greatly on the side of the latter; and it is but candid to admit that in opportunities, also, the preponderance is still more in favour of the non-contagionists, many of whom, for a series of years, held official situations in the West Indies which afforded them ample means of observing this fatal disease, in various places and in all its forms.

An Essay on the Disease called Yellow Fever, *with Observations concerning Febrile Contagion, Typhus Fever, Dysentery, and the Plague; partly delivered as the Gulstonian Lectures, before the College of Physicians, in the Years* 1806 *and* 1807. By Edward Nathaniel Bancroft, M.D. Fellow of the Royal College of Physicians, Physician to the Army, and late Physician to St. George's Hospital. London, 1811, pp. 811.

Dr. Bancroft having, in the year 1806, been appointed to deliver the Gulstonian Lectures before the College of Physicians, made choice of the Yellow Fever as the subject for that occasion; and certainly no subject can be more interesting than Fever, the nature and causes of which are still involved in so much obscurity, and in the medical treatment of which disease we are still so far from being universally successful, that every attempt to add to our knowledge, and improve our treatment of so dreadful a scourge to mankind, deserves to be received with thankfulness, and examined with candour.

The Essay on Yellow Fever is divided into four parts; the first of which contains Observations on the Symptoms and Mode of Treatment. Previous, however, to giving a detail of the history and progress of the disease, the author enters into a discussion respecting the propriety of its present name. This is derived from one particular symptom, the colour of the skin; pretty general, indeed, but not universal, nor even essential to the existence of the disease, nor proportioned to the magnitude of its violence and danger. Were the name of the disease to be derived from a single symptom only, the author thinks *Causus* would be a more appropriate title; not only as a burning heat of the skin occurs more generally than yellowness of it, but because, also, the degree of heat existing, affords some indication for the successful treatment of the disease. A great objection that may be urged against both these names is, that these symptoms occur in various degrees in most other fevers, and are not characteristic of the nature and properties of any one. The fever in question has been called by Sauvages *Typhus icterodes*, but it is not generally connected with any morbid state of the liver or the bile; by Cullen, *Typhus cum flavedine cutis;* by the French, *Maladie de Siam*, and *Fièvre Matelotte:* by the Spaniards, *Chapetonado*, and *Vomito prieto;* the latter of which names the author thinks equally objectionable with Yellow Fever, since neither the black vomit nor yellowness is universally present, nor peculiar to this disease. Sporadic fevers, occurring in very warm climates from any accidental cause, are, the author observes, liable to be accompanied with the same severe and fatal symptoms which occur in the epidemic yellow fever, and have accordingly been confounded with this latter.

They are to be distinguished, first, by the causes of the former being generally some excess, over-fatigue, taking cold, or affections of the mind, operating, therefore, on a few individuals only; while the causes of the latter are of a more general nature, and operate on a considerable number of persons at the same time: Secondly, by their progress; the first being always of a continued type, the latter almost always manifesting a disposition to remit. It is of the epidemic disease the author principally treats, although his observations are equally applicable to both diseases.

There is reason, however, to apprehend, as frequently happens in nosological arrangements, that the above distinction of type is rather artificial than founded in nature. In the plethoric stranger, and in arid situations, the fever is usually ardent and continued; while in those who have resided some time in the climate, whose systems are reduced from a state of high health and European vigour, and in uncleared woody places, it frequently assumes the remittent form: in other words, the type will much depend on the habit of the patient, season, locality, and the nature and intensity of the peculiar exciting cause.

Symptoms.—As the attack and progress of these are well described by the Author, I shall give them in his own words.

"The progress and violence of the yellow fever differ greatly, according to the force of its cause, the vigour and excitability of the patient and the season of the year. When it prevails epidemically in hot climates, and attacks young and robust men, lately arrived from temperate regions, the disorder commonly appears in its most aggravated form. In this, the patient first complains of lassitude, restlessness, slight sensations of cold and nausea, which symptoms are soon succeeded by strong arterial action, intense heat, flushing of the face, redness of the eyes, great pain and throbbing in the head and in the eye-balls, uneasiness and pain in the stomach, oppression of the præcordia, a white fur on the tongue, and a dry, parched skin, with a quick, full, tense, and generally strong pulse, though it is sometimes oppressed and irregular. These symptoms are speedily accompanied by frequent efforts to vomit, especially after swallowing food or drink, with discharges, first of such matters as the stomach happens to contain, and afterwards of considerable quantities of bile, appearing first yellow and then green, sometimes tinged with blood, but in the progress of the disorder with matters of darker colours; an increase of pain, heat, and soreness at the præcordia, also occurs, with constant wakefulness, and frequently with delirium, more or less violent. This paroxysm, or exacerbation, which has been called the inflammatory, or the febrile stage, generally lasts thirty-six hours, but is sometimes protracted for seventy-two hours, and even longer, probably in consequence of either general or local inflammation (particularly in the brain or stomach), or of

irregularity in the circulation, which are known to prolong the paroxysms in fevers of type.

" A remission then occurs, in which many of the symptoms subside, so often as to induce a belief that the fever is at an end, and recovery about to take place. Frequently, however, the foundations of irreparable injury to the brain or stomach have already been laid in the former paroxysm; and, in such cases, the remission is short and imperfect. During these remissions, the pulse often returns apparently to the condition of health, the skin feels cool and moist, and the intellect, if previously disturbed, sometimes becomes clear; sometimes, however, the patient remains in a quiet and stupid state, a symptom generally denoting great danger.— Another sign of danger, as denoting a very morbid condition of the stomach, is the renewal of the efforts to vomit, when pressure is made on that organ, or food is swallowed. After a certain interval this remitting stage is succeeded by another, which may be called a second paroxysm, and which, probably would appear as a renewed exacerbation, if the violent effects of the first had not almost exhausted the patient's excitability, and in conjunction with the extreme depression of strength which usually attends inflammation of the brain or stomach, rendered him nearly unsusceptible of those morbid actions which are necessary for that purpose.— In this latter stage, then, instead of great febrile heat, and strong arterial action, the warmth of the body, and the frequency and strength of the pulse, are often less than when the patient was in health; but frequently the pain and heat in the stomach become excruciating, with incessant strainings to vomit, which in most of the fatal cases are followed by hiccough, and repeated discharges of matters resembling turbid coffee, more or less diluted, or the grounds of coffee, and also by evacuations of similar dark matters from the bowels. Here it is to be observed, that when these symptoms occur (indicating a violent affection of the stomach and bowels), the patient is in general, sufficiently in possession of his intellects to know those about him, and to give distinct answers to questions made to him, although his excessive weakness often renders him incapable of mental exertion, and his inability even to raise his head may induce the appearance of coma. In those cases, however, in which the brain has suffered greater injury than the stomach, the retching and black vomit, just described, do not so commonly occur, but, instead of them, low muttering, or coma, with convulsions of the muscles of the face, and other parts of the body, supervene. About this time, also, the tongue and teeth are covered with a dark brown fur; yellowness of the skin and petechiæ make their appearance; the urine, when passed, has a putrid smell and dark colour; the fæces likewise become most offensively putrid; hæmorrhages sometimes take place from the nostrils, gums, and various other internal surfaces; there is, in some patients, a suppression of

urine; in others, an involuntary discharge of it, and of the fæces; the pulse becomes feeble and intermits; the breathing is laborious; portions of the skin assume a livid colour; the extremities grow cold: and life is gradually extinguished."

The above description of the disease accords with the distinction which the author has attempted to establish; but as he is here delineating the most severe and fatal form of yellow fever, the propriety of characterising the subsidence of great heat and vascular action at the close of the first stage, as "a remission," is very questionable. It is, in fact, the transition from inordinate action to exhaustion—to that almost hopeless state which (the foundation of almost irreparable mischief having been already laid in the most important viscera) is speedily to terminate in disorganization and death, and has nothing in it of the salutary tendency of a remission. As Dr. Gillespie observes, "it is proper to caution young practitioners against a mistake very common with regard to the yellow, or ardent fever; that is, of taking the fatal stage which follows the cessation of ardent heat and great excitement, and which accompanies a sphacelus of the viscera, for a salutary crisis of the disease."—*Diseases of Seamen.* "Cette diminution des symptômes en impose quelquefois au malade, et même aux médecins inexpérimentés."—*Dict. des Sciences Medicales, tome* xv. *p.* 336. This declension of fever at the close of the first stage excited early attention, and is often so marked as to have been frequently mistaken for a proof of returning health. It is noticed by Dr. Hume, who had the charge of the Naval Hospital at Jamaica between the years 1739 and 1749, and was afterwards a Commissioner of the Sick and Hurt Board, in the following terms: "The pulse is at first full, quick, and strong, but in forty-eight hours after seizure, or thereabouts, it sometimes becomes calm and regular, scarce to be distinguished from the pulse of a person in health."—See *Dr. Hume's Account of the Yellow Fever,* published by Dr. Donald Munro.

The preceding (says Dr. Bancroft), is a description of the disease in its most violent form, and it sometimes proceeds with such rapidity as to destroy the patient on the third or fourth day, or even sooner. It seldom happens that in the most severe cases the head and the stomach are both equally affected; one of those organs, however, generally suffers such derangement as to destroy the patient. Those who die early in the disease appear to perish from an affection of the head, with less vomiting, whereas those who have the stomach more violently affected, are usually found to have their mental faculties clear, though much weakened; and they seldom expire before the end of the fourth, or the beginning of the fifth day. p. 17.

The *dissections* of patients dying of this fever have discovered appearances correspondent to the affection of the part most violently attacked by the disease. Where the affection of the head has formed the principal feature of the disorder, the integuments of the brain have generally been

found more or less inflamed, especially near the temporal bones; the vessels of the dura mater and of the pia mater were not unfrequently observed to be very turgid with blood, which was also sometimes extravasated. Effusions of watery fluid have likewise been seen over the surface of the brain, or in vesicles between the pia mater and the tunica arachnoidea. In some cases the integuments have been so firmly attached to each other, and to the brain, that in attempting to raise, or separate them, a part of the substance of the brain has been torn up. The volume of the brain is often increased, and the substance of it is, in some instances, more firm than usual; when cut, the vessels distributed through it have been so distended with blood, that the medullary part has immediately become thickly spotted with red points, owing to the oozing of blood from the divided vessels; and it was not rare to find that some of those vessels had been ruptured, and that blood had escaped into the substance of the brain. The ventricles usually contained water, of a yellow colour, and were, in some cases, quite filled with it. The plexus choroides has often been loaded with blood.

In those cases of the disease where the symptoms indicating a severe affection of the stomach have been predominant, inflammation of that viscus has been discovered upon dissection. In some cases, almost the whole inner surface was inflamed; very often portions of the villous coat were abraded, and not unfrequently observed floating among the contents of that viscus. Marks of inflammation, but less violent than these, have also been often seen in the smaller intestines, especially near the pylorus. The inflammation seems to be of the kind denominated erythematic; this kind of inflammation is apt to spread, the author observes, wherever there is a continuity of membrane or of structure; and as such continuity exists through the whole alimentary canal, the viscera nearest to the stomach must be liable to participate in the inflammatory affection of the latter.

The *Black Vomit* is so universal a symptom in severe cases of yellow fever, that it becomes an important object to ascertain its source and origin. Many writers have attributed it to a superabundant and altered secretion of bile, but certainly without foundation, as is evident from the facts stated by our author, both from his own observation and that of several other physicians. In the greater number of dissections the liver has been found in a healthy state, and where it has differed from its natural appearance, it has frequently been of a paler colour; the gall-bladder has also, at the same time, been found in a healthy state, containing its usual quantity of bile, not at all altered in its appearance or properties.

At a time when the stomach has been distended with black vomit, the passage from the duodenum into the stomach has been completely obstructed by the pylorus valve, so that no portion of the matter could have been derived from the hepatic system, in every part of which system the bile was quite natural in colour, taste, and consistence. The matter of black

vomit, compared with bile, differs materially from it in all its physical qualities; "it differs from it in colour; for, however dark the bile may appear in its most concentrated state, it always displays a yellowish or greenish-yellow tinge, when spread on a white surface, or when diluted; and this is never observed with the matter of black vomit. It has also been found, that an addition of bile to the latter, altered its nature so much as to give it an appearance different from what it had before; nor could the black vomit be imitated by any mixture of various proportions of dark-coloured bile with the fluids found in the stomach. It differs most decidedly in taste; the black vomit being always insipid, when freed from other foreign matters, whereas the bile can never, by any means, be deprived of intense bitterness."

If, then, the black vomit is not bile in a morbid state, nor contains any portion of that fluid, whence is it derived? It must proceed from the stomach itself, and appears to be, in most cases, a consequence of inflammation of that viscus. Some physicians have entertained an opinion that the black vomit is a particular morbid secretion by the inflamed vessels or glands of the stomach; Dr. Bancroft thinks, that "it is merely blood which has been effused from some of the small arteries, ruptured in consequence of the separation of certain portions of the villous coat, and has coagulated within the general cavity of the stomach, or on the surface over which it was effused; and, having been afterwards detached and triturated by the violent and frequent contractions of that organ in the efforts to vomit, has had its appearance as a coagulum of blood altered, and its colour darkened by the gastric juice, or by some chemical decomposition, either spontaneous, or produced by the action of the air, or other matters contained in the stomach." In confirmation of this opinion, it is stated that, in many cases, portions of the inner surface of the stomach have been covered with a coat of thick, blackish matter, and, upon removing this coat, the parts beneath it, and no other, were found inflamed. The substance thus obtained was exactly similar to black vomit, and there is reason to believe that it must have been derived from the vessels of the inflamed part. At those spots moreover, where the villous coat had been abraded, the extremities of arteries have been frequently seen filled with this dark-coloured matter; and collections of the same matter have even been discovered immediately under the villous coat. A relaxation of the vessels of the stomach may give rise to hæmorrhage from that viscus, as we find happens in some cases of extreme debility, and, probably, this may take place in some very few instances of yellow fever, where the coats of the stomach remain entire; but the author concludes, with great reason, "that the black vomit is much less frequently the consequence of a relaxation of vessels, than of a separation of some portions of the internal coats of the stomach."

The *Affections of the Skin* in this disease are in some respects similar to those which take place in other fevers; during the strong arterial action

which succeeds the first attack, the skin becomes excessively dry and parched, with an intensely burning or pungent heat. Sweats are, in this stage, a very rare occurrence: and, when they do appear, no relief is afforded by them. A feeling of general soreness of the skin also takes place in many patients. Of the yellow suffusion which has given name to the disease, we have the following description:—

"The yellowness begins, in a few cases, within the first forty-eight hours; sometimes on the third day, and frequently not until the fourth or fifth. It is, indeed, sometimes observed but a few minutes before, or a little after death. I believe that, in many instances, it might, with attention, be discovered on the eyes; but it is commonly first observed on the cheeks, extending towards the temples, and about the angles of the nose and mouth; about the lower jaw and on the neck, along the course of the jugular veins, whence it afterwards spreads in stripes and patches along the breast and back, downwards, so as at last to become universal in some patients, though in others it remains partial. The yellowness is sometimes of a dingy or brownish hue, sometimes of a pale lemon, and at others of a full orange colour. When the yellowness appears only in patches or spots, and of a dingy or brownish hue, these are frequently intermixed with other spots of a florid red, or a purple, or livid colour."

This yellowness of the skin is, with one partial exception, derived from the bile; and the manner of its entrance into the bloodvessels is thus accounted for by the author. "When there has been very frequent and violent vomiting for some length of time, the stomach, diaphragm, and abdominal muscles, are apt to become irritable to an extreme degree, so that at each effort of the former to discharge its contents, the latter will frequently be thrown instantaneously into strong spasmodic contractions, and the liver, together with the gall-bladder, will be, as it were, suddenly caught, and tightly squeezed in a powerful press; the necessary consequence of which pressure seems to be, that all the fluids contained in that viscus will be driven towards both extremities, backwards as well as forwards, in those vessels which are not provided with valves to prevent their retrograde motion. Under such circumstances it can scarcely be doubted, that the bile will be forced to regurgitate in this manner, and pass from those ducts into the vena cava at each violent compression of the liver; and that, by continued and strong spasmodic contractions of the before-mentioned muscles in vomiting, a considerable quantity of bile may be carried into the circulation, and a yellow suffusion, resembling jaundice, be very speedily produced."

In this manner, also, is the yellowness of the skin accounted for which succeeds from the bite of venomous reptiles, and the poisoning by some species of mushrooms, and certain poisonous fishes; in all which cases, violent convulsive vomiting is a usual symptom. The exception to the yellow suffusion being derived from the bile, refers to those cases in which

the yellowness of the skin occurs partially, or *in patches* or spots ; in these instances it is thought to be produced by a cause similar to that which produces the yellowness that follows ecchymosis, and to be connected with that particular state of the blood and of the vessels, which gives rise to hæmorrhages from various parts of the body, external and internal. It is accordingly in these last cases that extreme danger is more certainly indicated, than in the general suffusion arising from compression of the liver.

Having given Dr. Bancroft's account of the black vomit and the yellow suffusion, I may remark that his explanation of the nature and origin of the former (though somewhat different from the view of Dr. Jackson, in his Sketch of the History and Cure of Febrile Diseases, p. 63-4), nearly coincides with that of other accurate observers of the phenomena of the disease and the appearances on dissection.*

With respect to the yellowness of the skin, Dr. Bancroft's explanation is not quite so satisfactory. Drs. Dickson and M'Arthur both inform me that they have occasionally seen this symptom, previous to the occurrence of vomiting; as well as in cases where, from great attention to allay the gastric irritability, or other causes, as when the head is greatly or chiefly affected, but little vomiting, comparatively, had occurred in the course of the disease ; and Mr. Dickinson, in his work, also remarks, " that vomiting does not always precede, nor does it always occur when the bilious suffusion takes place." p. 171.

That of Broussais appears the more correct exposition. He is of opinion that the yellow colour depends solely on the violent irritation of the duodenum, which is propagated to the secretory organ of the bile; that all the other symptoms of this fever are those of inflammation of the stomach and small intestines; and that the researches of Pugnet, Tommasini, Dubrieul, and many others, leave no doubt of the correctness of this determination respecting the seat of the disease.

The yellow, dingy patches in the advanced stage, which our author considers an exception, produced by a cause similar to the yellowness following ecchymosis, and probably connected with that peculiar state of the blood and loss of power in the smaller vessels which gives rise to passive hæmorrhage, is indicative of the worst stage of the disorder; and is probably dependent on the peculiarly unfavourable habit, or deleterious nature of the exciting cause, and sometimes on the previous treatment of the patient.

The yellow fever has, by several authors and practitioners, been confounded with the plague, as well as with typhus, from both of which it essentially differs. Reserving for discussion in another part of the volume

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* See Dr. Bancroft's Appendix, No. 1, containing " Observations on the Black Vomit," by Dr. Physic and Dr. Firth, extracted from the New York Medical Repository, vol. 5th, p. 129, and Dr. Cox's Medical Museum, vol. 1st, p. 116-118, also Dr. M'Arthur's account in the subsequent pages.

the question, whether yellow fever, like the others, can be propagated by contagion; the author next lays down several *diagnostic signs* by which these diseases are to be distinguished from each other; the yellow fever differs from the plague, in that it prevails only in those countries and in those seasons in which the heat is, or has recently been, so great as would destroy or stop the progress of the plague; in the inter-tropical climates, therefore, so favourable to the existence of the yellow fever, the plague is not at all known. The glandular and cutaneous affections, called buboes and carbuncles, so constantly accompanying the plague, are not found to exist in the yellow fever. A violent febrile paroxysm is essential to the character of yellow fever, whilst, according to the best authority, persons have been attacked with the plague without having the least febrile affection, as sometimes happens in small-pox, scarlet fever, and measles. Blacks are very rarely seized with the yellow fever; and, when seized, are much less violently affected by it than Whites, living under the same circumstances; whereas they are not less susceptible than Whites of the plague, and die of it in a far greater proportion.

"Yellow fever differs from typhus in the following circumstances, viz. it prevails, as I have already mentioned, only during, or immediately after, very hot seasons, in which typhus is soon extinguished; and it is, in its turn, completely extinguished upon the accession of cold weather, in which typhus is commonly most prevalent; it attacks most readily and most violently the young and robust, over whom typhus is allowed to have the least power; it begins with much greater exertions of the living power than typhus; is attended with many different symptoms, and terminates much sooner; it is, besides, disposed to remit, and it frequently changes into a regular remittent, and sometimes even into an intermittent fever, which true typhus is never observed to do."

Having thus given a general outline of the symptoms and progress of the disease, the author proceeds to a consideration of the various remedies proposed for its cure, and offers some observations on the propriety and utility of each.

Bleeding.—A great contrariety of opinion, the author observes, has subsisted on the subject of *bleeding* in yellow fever; some considering it as an indispensable remedy, and others alleging that nearly all who were bled had died. Independently of actual experience, several circumstances attending this disease appear to render it probable, that the evacuation of blood would be serviceable to the patients labouring under it. This fever, especially the violent forms of it, seldom occur among any other persons than strangers recently arrived from temperate climates; the greater part of whom will commonly be found to be young, robust, and vigorous. In its first stage it is frequently accompanied with a very considerable degree of general inflammation (which is, the author thinks, perhaps greater than in any other kind of fever), indicated by a hard, full, and strong pulse; the

distressing sense of universal distention, the red, starting, watery eye, and the parched skin. Those who have fallen victims to the disease have generally exhibited, on dissection, signs of considerable inflammation in various organs, and especially in the head and stomach. That the duration of a paroxysm of fever is lengthened, and its distressing consequences augmented by general inflammation, is well ascertained by experience, and no method is so likely to obviate these as bleeding. To render it beneficial it should be resorted to very early (as within 24 hours, or even 12, if possible, from the attack); and to prove effectual, it should be performed copiously, from a large orifice, soon after general inflammatory action is perceived; more benefit arising from taking away a large quantity of blood at once, than by a larger evacuation at two or more bleedings. The propriety of the evacuation being made at all, however, and the quantity of blood to be taken, must be determined by the circumstances of each patient.

The above recommendation of bloodletting is feeble, when compared with that of several other modern authors, but I am not disposed to cavil with the writer on this account, or to pin my faith too exclusively on any remedy; for in different epidemics and states of the constitution, the same measure will be followed with very different results.—There can be no doubt, however, that in so powerful a disease, our hopes must chiefly rest on powerful means; and that in the class of subjects generally selected by this fever, the young and robust, the lancet should be used with a bold hand. But it should be ever kept in mind, that the chance of success will almost entirely depend upon its being used within a few hours after the commencement of the attack. When employed too late, it will certainly hasten, though it may smooth, the passage to the grave,—for it has often been observed that patients who had been blooded died with much less suffering than those who had not undergone this operation.

Cold Water is, our author thinks, a very efficacious remedy in the yellow fever; and, when applied externally, affords very great relief to the feelings of the patient, who is frequently distressed with a sensation of burning heat; the temperature of the skin, at the same time, being actually raised so much as four degrees of Fahrenheit's thermometer above the natural standard. It is only when the heat of the body is above the natural standard, that cold water should be applied externally; and the period of its application, and the frequency of its repetition, must generally be determined by the feelings of the patient; for, should he become chilled by it, much mischief might ensue. To avoid the fatigue to the patient, which the usual mode of applying this remedy is apt to induce, the author recommends, as a useful substitute, that he should be covered, as he lies in bed, with a single sheet wetted with cold water, which, by evaporation, will gradually reduce the temperature of his body to a proper standard.

Notwithstanding this caution, the affusion of cold water in the first stage

is by much the best and most efficacious mode of proceeding; but, as the disease advances, aspersion, or ablution, may be substituted with advantage, for then the shock might be injurious, and the object is to allay morbid heat and febrile irritation.

The author is of opinion that much benefit also arises from cold water taken internally as drink; small quantities of which, frequently repeated, he has observed to moderate the excessive heat of body, as well as the violence of general febrile action; it is efficacious likewise in disposing the skin to perspire gently, and in preventing inflammation of the stomach, or diminishing and removing it after it had been excited. The author's experience is confirmed by that of several other practitioners; and the general utility of cold drinks in fevers has been acknowledged by all physicians, ancient as well as modern, while the author thinks it has been too seldom employed by British and American physicians in their treatment of yellow fever.

Purgatives are proper to obviate that state of costiveness which frequently precedes, and generally accompanies, yellow fever; they should be such as will not offend or irritate the stomach by their bulk or quality; the author appears rather to employ them for the purpose of preventing an accumulation of fæcal matters, which might produce morbid irritability in the whole intestinal canal, and aggravate other symptoms, than as means of carrying off the fever, as has been proposed by Dr. Hamilton in the fevers of this country.

Here, also, the author is too sparing in his approbation of so valuable an auxiliary as purgatives; though he very properly recommends such as will not offend the stomach by their bulk or quality. Full doses of calomel combined with jalap, compound extract of colocynth, &c., assisted by enemas, if necessary, should be given so as to ensure early free evacuations —nor should we rest until this object be obtained; and such quantities of medicines of this class should be repeated during the course of the disease as will obtain two or more motions daily.

Emetics are very properly reprobated by Dr. Bancroft in the yellow fever, on the grounds that gastric irritability is usually a very early symptom—one of the most difficult to allay—and of the most dangerous tendency. So far from being removed, it is too invariably aggravated by the use of emetics; as indeed must be expected when the irritability of this organ, instead of being caused by bile, undigested aliment, or other offending matter, originates from sympathy with the morbid condition of the brain or of the surface, or, as is too often the case, from rising inflammation in the coats of the stomach itself. Neither, observes our author, are their pernicious effects confined to this viscus, for the violent efforts to vomit exhaust the strength and propel a larger quantity of blood to the brain, already suffering from undue excitation. Instead of increasing, therefore, the object is to calm and allay the irritation of the stomach as much as

possible; and the most likely method of effecting this indication is by an active and judicious employment of such means as lessen the general fever and local inflammatory action—by keeping the bowels freely open, by abstracting morbid heat from the surface, by avoiding the irritation of distention from drink or medicine, and by the counter-irritation of a large blister over the epigastrium. With the same view Dr. B. has tried small doses of opium, as half a grain at intervals; but though it might succeed in allaying a slight degree of gastric irritability, the utility of opium is not only very questionable, but in the early stage, or in a high state of vascular or cerebral excitement, it must prove decidedly injurious.

Sudorifics are also justly disapproved of by Dr. Bancroft, as tending to increase that disposition to vomit, from which the greatest danger is to be apprehended. The preparations of antimony, especially, too often leave behind them a degree of gastric irritability which resists all our endeavours to appease it, and there can be no doubt that, by aiding this formidable symptom, they have been too frequently employed to the irreparable injury of the patient, while the intention with which they are exhibited cannot be effected by such means. For this purpose, saline draughts in a state of effervescence, and other mild febrifuges, may be used; but the most effectual mode of restoring the natural functions of the surface, is by cold or tepid affusion, or ablution, and such other measures as lessen morbid heat, and febrile action.

The Peruvian Bark, Dr. B. thinks, may be exhibited as soon as the febrile commotion subsides: but, like opium, the early use of cinchona is of very questionable propriety: there will be a risk of its reproducing vomiting if it has subsided, and if it continues, any attempt to make bark remain upon the stomach is equally hopeless and objectionable. Indeed, Dr. B.'s caution not to give it "when there is a parched skin, a hard pulse, a dry tongue, great heat and pain at the stomach, or delirium," is tantamount to a prohibition in a vast majority of instances; for too often are some of those or other dangerous symptoms, where it is equally inadmissible, the very difficulties with which we have to contend.

These observations, however, chiefly apply to the ardent continued form of yellow fever. For in cases where decided remissions are observed in marshy situations, and in habits reduced by long residence, or otherwise; in fine, where the febrile movements are neither of the same rapidity, nor inflammatory tendency, the bark is often of the greatest service, and is chiefly depended upon in the French, and some of the other islands, most fruitful in vegetable life and decay. When the violence of the first stage is passed, and the patient is rapidly merging into a state of great exhaustion and depression of the nervous energy and vital power, cordials and stimulants, as wine, or even spirit diluted, ammonia, capsicum, &c. are to be resorted to; and small quantities of some bland nutritious matter should be cautiously but assiduously administered. But instead of attempting to do

too much in the advanced period, we should carefully remember, that it is only in the first and inflammatory stage, and soon after its onset, that we can hope by active measures either to subdue the disease, or to disarm it of its dangerous tendency to rapid disorganization and death.

It is not to be wondered at, that in a disease so frequently fatal in its event, and so unmanageable by mild and ordinary methods, recourse should have been had to *mercury*, whose effects upon the animal œconomy, whether salutary or deleterious, are generally very powerful. It certainly has been employed to a considerable extent in yellow fever, but whether advantageously or not is a matter of some doubt. No inconsiderable authorities may be adduced on each side of the question, and their decision of the point in dispute, is said equally to rest on the basis of experience. The most common operation of this metal, when exhibited internally, is either to produce copious evacuations by stool, or to act upon the salivary glands, so as to excite considerable salivation; and in both cases, benefit has been said to be derived from its exhibition. In those cases of recovery which have followed the employment of mercury, some evident effects of its operation have been commonly manifested, while, in cases which have terminated fatally under its use, no perceptible action has arisen from it; whence the recovery in the former case has been attributed to the action thus produced, while the fatal event has been supposed to be owing to the want of such action. Such reasoning, however, there is ground to think is too often fallacious. Supposing that the patients labouring under yellow fever, in whom a salivation can be excited, generally recover, it is not necessarily to be inferred, that their recovery was effected by the salivation; or that when patients died, to whom mercury had been given, and no salivation had been produced, such patients died because mercury had not been taken in sufficient quantity to produce that excretion. It is far more reasonable to conclude, Dr. B. thinks, that where persons have recovered from the yellow fever, after having been salivated, their recovery was not occasioned by the salivation, but was the consequence of such a condition of the powers of life, and of the functions connected therewith, as induced a mitigation of the disorder; for the same reason, and, perhaps, in the same degree as it favoured the operation of the mercury upon such persons; and, therefore, that although recovery has not unfrequently followed or accompanied salivation, the latter was not the cause of the former. In like manner, there is reason to conclude, he thinks, that when patients die of yellow fever, after all attempts to excite salivation in them have failed, their deaths have resulted, not from the want of any good effect which salivation may be thought capable of producing, but because the condition of their living or sensorial power, and of the functions depending thereon, had already become so morbid, as to render their recovery impossible. We shall here give the summary of our author's reasoning upon this important subject, the exhibition of mercury.

"In order, however, to attain the truth upon this important subject, it is not sufficient for us to discover, that recovery generally follows salivation in yellow fever, though even this is contradicted by many very respectable authorities; but we must ascertain whether those practitioners who excite salivation in as many of their patients as may be susceptible of it, under that disorder, do, in fact, lose a smaller proportion of them than those who purposely abstain from all endeavours to produce that discharge; and on this point I must declare, that after some experience, assisted by no ordinary portion of inquiry and information, I have not been able to discover that the salivators were more successful than the others. And, if not more successful, their practice has certainly been hurtful; because, in most of the persons who have recovered, the (perhaps useless) salivation had retarded the convalescence, and produced very troublesome affections of the tongue, mouth, and throat, with other ill-consequences, as is well known and acknowledged, even by its advocates. Dr. Chisholm (at page 357, of vol. i. of his Essay), warmly acknowledges his 'obligation to Dr. Rush, for supporting, in a masterly manner,' and 'pursuing the mercurial mode of treatment,' and expresses both 'admiration and respect' for his 'fortitude' in doing so.

"But Dr. Rush, notwithstanding this support and this fortitude, has candidly stated, that 'in the City Hospital (of Philadelphia), where bleeding was sparingly used, and where the physicians depended chiefly upon salivation, *more than one half died* of all the patients who were admitted.'

"To one who is sincerely desirous of discovering and adhering to the truth, it is extremely difficult to reconcile, or account for, the very opposite testimonies given on this subject; and the doing it would moreover be too invidious for me to attempt it. This, however, appears certain, that the good effects of the mercurial treatment have been greatly exaggerated by persons, who either were deceived, or were willing to deceive others; that many persons have died of the fever in question, although mercury, administered externally or internally, had produced a copious salivary discharge; and that, in very many others who have recovered, this discharge did not begin until after a solution, or a great mitigation of the disease had evidently taken place; which solution or mitigation, therefore, could not have been the effect of salivation."*

After having thus gone through the account of the symptoms and treatment of the Yellow Fever, we come to a consideration of its causes. A belief has prevailed of the contagious nature of this disease; and the origin of it, in different places, has been ascribed to the action of contagion.

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* Mr. Sheppard, in a very able paper, in the 13th volume of the Edinburgh Medical and Surgical Journal, has adduced the opinions of various modern practitioners in corroboration of the inutility of attempting to affect the system with mercury, during the active stage of yellow fever.

Our author strongly controverts this opinion; and, while he denies that any instances of the fever have ever been clearly shown to arise from contagion, he enters into an elaborate discussion, to show the impossibility of its doing so. It has been asserted by some authors of eminence, that *all* fevers are naturally contagious, and capable of exciting fever in other persons.* Among those who have so asserted, Dr. George Fordyce is to be found, and he has expressed himself very strongly on this subject; his opinion is, that a peculiar matter is *generated* in the body of a man in fever, which, being carried by the atmosphere, and applied to some part of the body of a person in health, causes a fever to take place in him; and he adds, that this infectious matter is produced by *all fevers whatever.* In confirmation of this opinion he adds, that "by repeated experience it is now known that, although it very frequently happens that a man coming near another afflicted with fever, is not afterwards affected with the disease, yet, of any number of men, one half of whom go near a person ill of this disease, and the other half do not go near a person so diseased, a greater number of the former will be affected with fever than of the latter, in a short period afterwards." Again, he says, "the author has known seven out of nine, who went near a person afflicted with fever, seized with the disease in the space of three weeks afterwards; there is, therefore, a perfect ground from experience, for believing, that coming near a person afflicted with fever is a cause of the disease."

Dr. Bancroft's objections to this opinion of Dr. Fordyce are thus stated. "This general indiscriminating assertion, if it were true, could only prove that some fevers are contagious; not that all are so. But the assertion is manifestly founded upon a supposed probability, or presumption that such effects would result from the causes here described; for no one can believe that an actual experiment was ever made by selecting a certain number of persons, and sending one half of them into close communication with a febrile patient, and afterwards contrasting what happened to those who were not allowed to approach any person labouring under fever. Nor would a single experiment afford any conviction on this subject, for reasons too obvious to require explanation. Much, also, would depend on the species of fever to which the individuals in question are supposed to have been exposed, which is not mentioned by Dr. Fordyce. Few persons, if any, doubt of the contagious quality of what is called Jail Fever, and few believe that intermittent fevers possess that quality." Before we go further, I must reply, in answer to these objections, that we can scarcely allow Dr. Fordyce's assertion to be founded upon a *supposed probability or presumption,* when he affirms that by *repeated experience* it is now *known,* &c.; and although we cannot prove that Dr. Fordyce actually made the experiment of selecting a certain number of persons, and sending

* Drs. Cleghorn, Robert Hamilton, John Clark, Fordyce, &c.

one-half of them into close communication with a febrile patient, and afterwards contrasting what happened to these with the condition of those who where not allowed to approach any person labouring under fever, yet, we may be convinced, from the well-known character of the Doctor, that he would not neglect any *practicable* method of ascertaining the truth of an opinion he was about to publish to the world. Would he not have been warranted in his conclusion, if he had ascertained, that out of a given number (sufficiently large) of patients coming under his care with fever, *more than one-half* had, within a short period, been near persons affected with fever? I do not think the validity of the argument at all depends on the *species* of fever, since it is evident that Dr. Fordyce was not now speaking of fevers propagating themselves by *specific* contagions, but of the *generation* of infectious matter in fevers, which might produce in other persons fever, either similar to themselves or different from them, depending on circumstances peculiar to the persons exposed to its action; and that he did not deny to intermittents the power of thus generating infectious matter we are assured, by his saying that intermittent fevers produce this matter, or, in other words, are infectious; and that "he *knows this from his own observation,* as well as that of others." So far as argument goes, grounded on facts, I think we have another in favour of Dr. Fordyce's opinion. Do we not sometimes see an individual in a family seized with fever, when no intercourse with other febrile persons could be traced, where, indeed, it was almost impossible any should have taken place? and do we not see afterwards several members of the same family affected with fever, communicated, as far as we can judge, by the person first affected? In this case, one of two things must be true; either the action of contagion cannot be so limited in extent, as has been contended, if the first person took the fever from infection; or a matter must have been *generated* in the person first affected capable of producing fever in others. We must chuse between the unlimited diffusion of febrile infection, or the generation of it in fevers arising from other causes.

Of *negative proofs,* I confess, Dr. Bancroft has produced sufficient to show that fever may sometimes exist to a considerable extent, without producing fever in other persons communicating with those originally attacked: some of these proofs I shall lay before my readers, only remarking first, that they are all instances of marsh remittent fever, and that Dr. Fordyce says, intermitting fevers are not nearly so apt to produce contagious matter, at least to propagate it, as continued fevers; and secondly, that most of these instances occurred in climates very different from that of this country, and it is to this country Dr. Fordyce's observations are perhaps chiefly intended to apply.

The first instance mentioned by Dr. Bancroft, is that recorded by Dr. Trotter, in his Medicina Nautica, occurring at the Island of St. Thomas's,

1762, where *all* the people who were lodged ashore during night, died afterwards on the passage, while the rest of the ship's company remained remarkably healthy. A similar instance also occurred in the crews of the Ponsborne and Nottingham East Indiamen, at the Comora Islands, in the years 1765 and 1766. Of this fever, Dr. Badenock, then surgeon of the Nottingham, observes, it infected *only those who slept on shore*, and having gone through them, the fever ceased; this, he says, was also the case with those on board the Ponsborne, of whom, it appears, no less than seventy died. "A similar occurrence is related by Dr. John Clark, in the first volume of his Observations on the Diseases which prevail in Long Voyages to Hot Climates, page 124; after describing the low place, 'covered with impenetrable mangroves,' at North Island, near the Streights of Sunda, where most of the East India ships take in wood and water for their homeward voyage; he adds, that 'a Danish ship, in 1768, anchored at this island, and sent twelve of her people on shore to fill water, where they only remained two nights. *Every one* of them was seized with a fever, of which *none recovered;* but, although the ship went out to *sea, none*, except the twelve who slept on shore, were attacked with the complaint.' Here, again, was a fever so violent as to kill every one in whom it was excited, and from a cause so powerful as to affect every one who was exposed to it; which, notwithstanding, did not reproduce itself in a single instance."

One of the most decisive instances of the non-contagious quality of the marsh remittent fever is, the author thinks, to be found in the late unfortunate Walcheren expedition, wherein nearly thirty thousand men and officers were attacked by fever, which proved fatal to nearly one sixth of the whole number of sick; and yet not a single case could be discovered in which there was reason to suppose that any one person caught the fever from another, either upon the island of Walcheren, or among the sick removed to this country; so that we may fairly conclude, if fevers of this description are ever contagious, and communicated to those not previously exposed to marsh miasmata, the instances are rare and solitary, and that, in general, they must be ranked as non-contagious; we shall see, hereafter, the author's reasons for classing the yellow fever among the species of marsh remittents, and his proofs of its non-contagious quality.*

Another question, amply discussed by our author, previous to his enumeration of the causes of yellow fever, is, whether a fever, strictly contagious, can be generated by an accumulation of filth, or of putrefying or

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* In enumerating the chief writers for and against contagion, at the commencement of this section, I have omitted Drs. Palloni, Arejula, Hosack, and several others, because they consider this disease as contagious, or infectious, in some situations, and in others not contagious; and, therefore, cannot, with propriety, be classed with either party.

putrid matters, or by the crowding of healthy persons into confined, or ill-ventilated, and unclean places? With respect to the first part of the proposition, the generation of contagious fever by the accumulation of putrefying or putrid *dead* animal matter, I believe the general opinion of the medical world is against putrefaction being a source of febrile contagion, and, therefore, it is unnecessary to repeat the various instances related by the author, of large masses of these matters existing in different places, and no fever having been traced to arise from them; but physicians are not so unanimous in their belief concerning the power of emanations from the healthy *living* body, to generate, when accumulated and concentrated, fever of a contagious nature, and, therefore, it may be worth while to state some of the arguments and facts adduced by Dr. Bancroft, in favour of the innoxious qualities of human effluvia, so far as regards the production of fever. That crowding, filth, and deficient ventilation, may take place in a variety of situations without producing contagious fever, the author has shewn in instancing the mode of life led by the inhabitants of the more northern climates, who are shut up for a long severe Winter in jourts, or subterraneous dwellings, each common to many families, in which they live in horrible filthiness, among whom fever is not known to arise: the wretched confined situation of the slaves on the middle passage of the slave ships, in a sultry climate, without any production of contagious fever among them; and the memorable occurrence of the confinement of British subjects in the Black Hole, at Calcutta, in June, 1756, where, out of 146 persons shut up a whole night in a dungeon, about a cube of 18 feet, only 23 remained alive in the morning; none of whom were afterwards affected with fever. All these instances, however, having occurred in climates where the extremes of temperature might be supposed to counteract and destroy the tendency to contagion arising from these circumstances, it becomes of great importance to examine Dr. Bancroft's explanation of the supposed production of contagious fevers from similar circumstances in this country.

The first memorable instance of mortality from the apparent effects of morbid contagion, noticed by our author, is that occurring at the Black Assize, at Oxford, in the month of July, 1577. The circumstances of this event are well known, and the opinion has been generally prevalent, that the disease was communicated by infection. The author, at great length, and with much ingenuity, endeavours to controvert this opinion; I must refer my readers to the work itself for the arguments he makes use of for this purpose, and content myself with giving the conclusion he draws, as the result of his investigation.

"The most probable *meaning* of all these accounts would seem to be, that, about the time when sentence was passed on the prisoners, a noxious vapour, in some degree perceptible by the senses, and proceeding either

from the prisoners, or the* earth, had been suddenly diffused through the hall, and that, in consequence thereof, a great part of those who were present had been almost immediately attacked, and that many died within a few hours.

There is, however, no cause of disease with which I am acquainted, whose effects would have been such as are here described. Pestilential contagion cannot be suspected, because that would have required *contact*, and because the symptoms of the disease were not like those of the plague, nor was it contagion. And there is as little reason to suspect the contagion of typhus, or jail fever (especially at that season of the year), there being no instance recorded or known, of its producing disease so suddenly, nor of that disease, when produced, terminating so speedily in death. Nor were the symptoms such as occur in jail fevers: nor does the contagion of that fever spare women, children, and *poor people*, as the cause of this disease is stated to have done (but on the contrary): nor do the stoutest and most robust sooner perish by it, as the Register of Merton College declares to have happened in this disease. ('Et ut quisque fortissimus, ita citissime moritur.') "Whether the facts connected with the production and nature of this disease have been misrepresented, or whether it proceeded from a cause which has ceased to operate in later times, I leave for the decision of others."

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* Camden makes use of the words *venenoso et pestilenti halitu, sive fœdore incarceratorum, sive ex solo* ita correpti sunt plerique omnes qui aderant, &c. and Sir Richard Baker says, "suddenly they were surprised with a pestilential savour; whether arising from the noisome smell of the prisoners, or from the *damp ground*, is uncertain." Dr. Bancroft, in a note, observes, "the expressions seem to point at marsh effluvia, which, at that season of the year, would be more likely to occasion disease than typhus contagion, and in a shorter space of time, and chiefly upon vigorous men; probably, also, the situation of the place was suitable for their production. The old Shire Hall, in which sentence was passed on Rowland Jenks, was placed in the *yard* of Oxford Castle (once deemed impregnable), which stood on the west side of the town, at a small distance from the river *Isis*, whose banks, especially at that time, were low. The prison was also within the Castle, at about 200 yards distance from the Hall, and consisted of a multangular tower, called St. George's (on the west side of the Castle), together with an adjoining church, which also bore the name of St. George, and two square rooms, all connected one with the other, and made the common gaol for the county, by a statute in the reign of Henry the Third. See Grose's Antiquities of England, vol. iv. p. 182-3; also, King's Vestiges of Oxford Castle, p. 28. In the Appendix to Thomas Hearne's Preface to Gulielmi Neubrigensis Historia, &c. p. 88, is a print representing the Castle of Oxford, and on the other side of the river is a mount, at the foot of which are the ruins of an old building, which are thus described in a note to the plate, viz. 'Reliquiæ domûs in quâ *assizæ* olim tenebantur, donec *ob pestem* subitaneam ad alium civitatis locum regnante *Elizabethâ* transfere placuit.' But although I think marsh miasmata a more probable cause of the disease in question than typhus contagion, I am far from believing that they would have produced effects, such as are said to have occurred at this Black Assize."

Passing over the accounts of sickness and mortality occurring at Exeter, in 1586; at Taunton, in 1730; and at Launceston, in 1742, since Dr. Bancroft does not seem to deny there being instances of jail infection, we come to the remarkable occurrence which took place at London, in May, 1750, at the Sessions of the Old Bailey, which proved fatal to the Lord Mayor and two of the Judges, with several eminent and other persons. These were supposed to have been infected by the contagion of jail fever, brought into the court from Newgate. Such was the opinion of Sir John Pringle, Dr. Hales, and other eminent men. Our author, however, is of a far different opinion; and having given in the Appendix a copious statement of the whole transaction, and pointed out an important fact, acknowledged by those who have recorded the occurrence, viz. the *opening of a large window* in front, and on the *left* hand of the court, proves that the mischief done, or sickness produced, was confined to* those who were placed in the direction of this stream of *cold air*, which, *therefore, contained and conveyed the morbid influence, whatever it was, that occasioned the fever;* and endeavours to shew that this stream of air did not direct the *putrid streams* to that part of the court where the Judges were seated, as asserted by Sir John Pringle; but that the disease which took place in the different individuals was in consequence *of the morbid affection from the application of cold.* Whatever objection may be urged against the opinion of this fever being produced by cold, on account of the *great mortality* which took place, will apply, the author thinks, with equal force, against its having been produced by contagion, since the most concentrated and virulent jail infection ever known in this country, has never produced a fourth part so many deaths among an equal number of sick; and he adds, "though the mortality in question was greater than I should have expected from a fever produced by the sudden application of cold, yet, so many things are capable of increasing and aggravating the morbid effects of that cause, particularly by inducing local and mortal inflammation in some important organ, or viscus, that it is much less surprising that a fever so produced should occasion an unprecedented mortality, than it would have been, if so many deaths had resulted from a jail or typhus fever."—*See Appendix, No.* iv. *p.* 653.

I have been thus full in stating our author's view of the question respecting the generation of contagion, because it is one of serious importance, and one on which much uncertainty still prevails. Little doubt has been entertained by many men of respectable talents and extensive observation, of the generation of contagion in close and ill-ventilated apartments; I shall instance two only, the late Dr. Murray, of London, who took so active a part in the establishment of a fever-house of recovery in

* Dr. Bancroft has given an engraved plan of the Old Bailey, describing the precise situation of the Judges, Jurors, &c.

the metropolis, and Dr. Ferriar, who directed his attention to a similar establishment in Manchester, because they may be supposed to have enquired into the subject with the greatest care. The latter says "It is a fact, equally alarming and true, that many persons in indigent circumstances are exposed, in our great towns, to such evils as I have shewn to be *productive* of febrile contagion."

"One of the most satisfactory instances of this sort was observed by Dr. Heysham, at Carlisle, in 1778 or 1779. A fever of the nervous kind raged in that city, which did not seem to have been introduced from any neighbouring place. Dr. Heysham, with great industry, traced its *origin* to a house near one of the gates, which was tenanted by five or six very poor families; these unhappy creatures had blocked up every avenue of light with which even wretchedness could dispense, and thus contaminated the air of their cells to such a degree as to *produce* the poison of fever among them." "The plague itself appears to *originate* with the crowded inhabitants of the miserable villages in the East."*

No doubt, however, can exist of the propagation of the febrile infection being facilitated by want of cleanliness and ventilation; and this knowledge will be a sufficient inducement to obviate this source of its diffusion when practicable.

The most frequent, or rather, according to our author, the only exciting cause of yellow fever, is the application of marsh miasmata to the human body, and the disease, therefore, is really a marsh remittent fever. The opinion held by some eminent men, that fevers of this description, might be produced by simple moisture alone, is, I think, successfully controverted by Dr. Bancroft; and he accordingly looks for the specific cause of the fever arising into the air in something from the decomposition of animal or vegetable matters. Sufficient has been stated in the former part of the volume to show that the most extensive decomposition of animal matters may be going on, without any disease taking place in those exposed to the exhalations therefrom; it follows, then, that the noxious particles, whatever they be in marsh exhalations, arise, in general, from the decomposition of vegetable substances; and this opinion is strengthened by the fact that fevers are sometimes produced in persons employed in the preparation of flax and hemp, and in those who continue near the heaps of indigo plant laid together after the colouring matter is extracted. Whether any one particular gas, known to be produced by vegetable decomposition, or a combination of several of these gases, or some matter not yet detected, is the efficient cause of the disease, can, in the present state of science, be no more than matter of conjecture. We know, however, that the *action* of this cause is facilitated and increased by the concurrence

* Ferriar, vol. I. p. 240 and 245.

of certain circumstances, and that its operation is more powerful in hot climates and hot seasons, than in the contrary; but our author points out a difference of *susceptibility* in persons exposed to marsh miasmata, which renders their influence on the system more or less powerful; his observations on this subject are so important, that I cannot refrain from laying them before my readers.

"There is, however, *another condition of the body*, which is of great importance, in regard to the production of yellow fever, and which, therefore, requires a particular investigation; I mean, the *cause* of that remarkable *susceptibility* to this *disease*, which is commonly found in persons who have just arrived at places where it occurs, from cold or temperate climates; and of the equally remarkable exemption from it, which is commonly experienced by the *old* inhabitants of hot countries; and which, in the latter, is universally ascribed to their having become seasoned, as it is called; but, however familiar this term may be, and of whatever importance its proper signification really is, (since it involves the means of preservation from one of the most dreadful maladies which afflict the human race) it has been long employed either without any precise meaning, or with meanings which are inadmissible. Thus it is often said, that a person is seasoned who has once had the yellow fever; but very improperly, because the same individual may have the disorder several times; besides which, many persons become exempt from the fever, and ought, therefore, to be considered as being truly seasoned, without having ever suffered an attack of the disease. It is also frequently believed, that one may become seasoned by residing long in those towns in which the yellow fever is apt to recur; but the very great numbers of the inhabitants of Philadelphia, New York, Malaga, Cadiz, Seville, &c. who have been swept off by the distemper, within a few years, are melancholy proofs that an efficacious seasoning is not to be acquired merely by such residence. Nor can it be said, that those who live near marshes are peculiarly seasoned, because, in hot countries, numbers of persons, who live at a distance from marshes, are proof against the yellow fever, although they are sometimes attacked with slight remittents or intermittents.

"After some reflection on this interesting subject, the various degrees of susceptibility which are observed in different individuals or in different places, seem to me capable of explanation on a very simple principle; I mean the effects of temperature on the human frame, which does not appear to have been sufficiently noticed.

"The body, whilst in health, is found always to be, with very slight variation, at the temperature of 98 degrees of Fahrenheit's thermometer, and there is good reason to think that any considerable variation from this point, would necessarily produce morbid effects. It seems, therefore, to be of high importance, that the body should be preserved from such devi-

ations; and the Author of Nature has, accordingly, provided efficacious means for that end. Different views are, indeed, entertained concerning these means; and since the later chemical discoveries have been made, it has been generally believed, that, in an atmosphere, the temperature of which is less than 98 degrees, the heat of the human body is maintained at that point, by a process similar to that of combustion, and depending upon a combination of oxygen gas (taken into the lungs by respiration) with carbon and hydrogen; and that, in an atmosphere heated above 98 degrees, the temperature of the body is kept down at that point by the effect of an evaporation of matters perspired from the skin. There are, however, insurmountable difficulties opposed to this doctrine, but a full statement of them would, in some degree, be foreign to the subject under our consideration; I will, therefore at present, only remark, that it is *utterly incredible* that these *opposite processes* should ever be carried on so *accurately in reference to each other*, and be so exactly *balanced*, as invariably to keep the body at the heat of 98 degrees in all the diversities of temperature that occur in different climates and situations, and therefore, that this important *conservatory* function must depend on a power more *exalted* in its nature, and more *certain* in its operations, which can be no other than the *power of life;* a power which, in proportion as it is more vigorous in robust individuals at the prime of life, notoriously enables them to resist the *opposite extremes* of heat and cold, and preserve their bodies at the proper standard more perfectly, and for a greater length of time, than at a more advanced age. I will not venture to assert, that no addition to the heat of the body can be made, either directly or indirectly, by the combination of oxygen with the blood, and I readily admit that its temperature may be diminished by a copious evaporation from its surface; but if either of these causes should co-operate with the living power to a small extent, the one in raising and the other in lowering what is called animal heat, it must always be in complete *subordination* to the higher principle of which I have been speaking, and to which Nature has committed the important charge of preserving the temperature of the body at the standard of health, amidst all the varieties of climate, and of external circumstances. This is a charge which cannot be fulfilled in an atmosphere like that of England, the mean temperature of which may be estimated at 50°, without a considerable expenditure of the living power, in order to generate constantly at the mean rate of 48° of animal heat; and after the body has been, for a length of time, accustomed to make this exertion, it is easy to perceive that, upon removing into a warm climate, such as that of the West Indies, the general mean temperature of which may be taken at 79° or 80°, very material changes in the functions of the system become absolutely necessary for the preservation of health.—But these changes are not to be suddenly effected; and, until the body becomes perfectly accommodated to the heat of this new climate, the whole animal

economy must be considered as almost in a state of morbid excitement. It is not this state (of excitement), however, which alone is productive of fever; since we know that innumerable persons have gone from Europe to the hottest regions of the globe, and have continued there for years, without being attacked by fever, when other causes did not assist in producing that disease. The inhabitants of South Carolina, as I have lately mentioned, were exposed to this kind of excitement, in an extreme degree, during a great part of the Summer of 1752, and yet had never been more healthy; and other instances of the same import might, if necessary, be adduced."

"But, although the simple operation of the warmth of hot climates upon the human body be not the cause of this disease, yet it is chiefly, if not entirely, to the various degrees of that derangement which it occasions in persons not accustomed to warm climates, that I attribute all those varieties of liability to the epidemic yellow fever, which are observable in different individuals, from the extreme susceptibility of northern strangers to the almost complete immunity of Creoles, and more especially of African negroes. It may be very difficult to point out the particular means by which heat occasions this extreme susceptibility; and yet it is not difficult to understand, that a morbid cause may be able to produce a much more violent disease, when it is assisted by the co-operation of so powerful an agent as heat, than it could produce when acting by its own simple influence; and it is upon this principle that I shall endeavour to explain the general law by which the susceptibility to the yellow fever is, *cæteris paribus*, regulated."—p. 254.

The author then takes a concise view of the climates in which the yellow fever has principally raged, and applies the principle just mentioned, to the results which the experience of several years in each of them has afforded. It appears, that negroes are far less liable to be affected with yellow fever than white persons; and it was observed at Cadiz in 1800, that persons lately arrived in that city from the West Indies, did not suffer an attack of the epidemic, while those persons who had come from *Canada* and other *northern* countries, were very liable to the disease. The security from the attacks of this fever derived from the "*ability to endure great heat*," continues only so long as this ability continues; for if the inhabitants of warm climates remove for a few years into cold countries, and afterwards return, they are then found liable to the fever. From all the facts stated, and from the repeated observations made by the author, he thinks himself justified in his opinion, that the joint influence of marsh miasmata, and of an atmosphere unusually and sufficiently heated, upon persons habituated to a cold or temperate climate, is of itself fully capable of causing an epidemic yellow fever, exactly resembling that which has committed such ravages in the West Indies, the United States of America, and the South of Europe.

Upon the preceding theory, that those varieties of liability to the epidemic yellow fever which are observable in different individuals are to be attributed " chiefly, if not entirely, to the various degrees of that derangement which heat occasions in persons not accustomed to warm climates," it may be necessary to offer some observations; for there is reason to fear that this view of the subject is much too limited. The ability to endure great heat is undoubtedly a considerable, but it is not the only, or perhaps even the chief source of immunity; otherwise those who have been inured to other tropical regions, where the temperature is as high, or higher than it is in the West Indies, would be protected from the yellow fever, which is far from being the case. The leading features of Dr. Bancroft's writings are, great industry in research, and acuteness in argument. Admiring these talents, it is not from a disposition to criticise, but from the momentous importance of this part of the subject, that I am induced to reconsider his discussion of the question—in what does this seasoning consist? He contends, that it is not from having previously undergone the fever, because the same individual may have it several times; and because many persons become exempt without ever having suffered an attack of it. To this it may be answered—it is true that a person is not secured by having had the fever once, as some writers of limited experience have discovered, but it is also true that he will be less liable after having sustained an attack of this, or any disease which reduces the tone and vigour of the system; and that those who escape altogether do not acquire their security by mere length of residence, and consequent habituation to the predisponent, tropical heat, but also because they have been *gradually* exposed, and inured to the other remote causes of the disease.* Again, Dr. B. observes, it is not from residing long in *any* place in which the yellow fever is apt to occur, as the multitudes who were swept off at Philadelphia, New York, Malaga, Cadiz, &c. abundantly demonstrate; but these are places in the temperate zone, whose variations of climate must ever prevent the inhabitants from acquiring unsusceptibility, as will appear more clearly hereafter; and if seasoning cannot be induced by intertropical residence alone, with how much less reason, *à fortiori*, can such effect be expected from the ultra-tropical situations above specified. The last argument of Dr. Bancroft is—that it is not from residing habitually near marshes, because numbers of persons who live at a distance from marshes in hot climates are proof against the yellow fever, although they are sometimes attacked with slight remittents or intermittents. (p. 246.) Now, in the first place, the living at a distance from marshes proves little or nothing, because the whole bearing of Dr. B.'s researches is to show that febrific exhalations " are often emitted from soils and situations which have no resemblance to a marsh" (Sequel, p. 254);

* Mr. Sheppard has further illustrated this subject in a paper inserted in the 47th Number of the Edinburgh Medical and Surgical Journal.

and secondly, as these people do suffer attacks of the milder recurrent type, they certainly would be liable, at particular seasons, to the more aggravated form of fever, if they had recently arrived, instead of having been gradually inured to these miasms; or if, though favoured by longer residence, they were exposed to more concentrated miasmata. Upon the whole, then, it is not upon any simple principle—as the being accustomed to great heat, that we can explain the grounds of exemption from yellow fever.

If this disease were simply a calenture, as Moseley and some later writers seem to consider it, then indeed we need look for no farther source of exemption than the power of resisting the effects of high temperature; but as the novelty and consequently the force of the impression of insolation must be greatly diminished by habit, and as, notwithstanding individuals have too frequently fallen victims to yellow fever who have been exposed for years together to a tropical heat, when brought fully under the operation of noxious causes, the conclusion is inevitable, that habituation to the local febrific effluvia, be they from the soil or other source,—and to other agency, beyond that of solar heat, is indispensable to security. In proof of this, medical men who have resided for a length of time in the Antilles, have repeatedly observed individuals fall victims to the yellow fever, after having been two, three, four, or more years in that country; evincing that the being inured to a high temperature is but one disqualifying property, and, of itself, unable to confer immunity (though I am far from questioning its relative importance in greatly contributing to this result), when other powerful exciting causes are applied.

The Fourth Part of this Essay contains a history of the yellow fever in the various places in which it has often prevailed as an epidemic; the intervals of its appearing epidemically are sometimes considerable, while at other times the fever rages more frequently. In no instance, however, can its origin be traced to contagion, but it seems always to have been produced by local causes, aided by the increased temperature of the season. Our author, therefore, next endeavours to establish the *identity*, or *near affinity* and *connexion* of the yellow fever with the fevers which are indisputably and notoriously produced by marsh miasmata. These latter have certain *characteristic peculiarities*, which are pointed out by the author, and afterwards compared with those phenomena which accompany the yellow fever, to shew the very great similarity and near resemblance between the two diseases.—These characteristic peculiarities of marsh fevers, as stated by Dr. Bancroft, are, 1st. That of occurring in their simple and mild form of intermittents during the Spring. 2nd. That of being exasperated, converted to *remittent*, and apparently to *continued* fevers, by excessive Summer heat; and this generally with a great increase of malignity, (especially in low and moist situations), when this excessive heat is long continued, and accompanied with *a total, or very unusual, deprivation of rain.* 3rd. That of their being re-converted and

brought back to their mild intermittent form, at the approach or commencement of Winter, and afterwards extinguished, or suspended, by a continued frost. 4th. That of most frequently and violently attacking strangers from colder climates and more salubrious situations. And, 5th. That of never being communicated from person to person by a contagious property.

In addition to the facts and authorities already mentioned in the former part of the volume, as tending to prove these peculiarities in marsh remittent fevers, the author brings a great number of additional proofs to the same point, and afterwards shews the existence of similar phenomena in the yellow fever, in his account of the history of its origin and progress in almost all of the West India Islands, and at several places in North America. To follow Dr. Bancroft through the whole of this diffuse statement is impracticable, but I shall subjoin his inferences on the subject of the identity of the two diseases, which naturally arise from the history and statement he had previously given.

" Those of my readers who, by a love of truth, may have been induced to follow me attentively in the *view* which I have now taken of the yellow fever in different parts of America, and whose minds are unbiassed, will, I am confident, clearly recognise in that disease, *all the peculiar features and characteristic marks* by which *marsh* fevers are distinguished in all parts of the world. And they will naturally conclude, that though it be the most aggravated and violent of the fevers arising from miasmata, this aggravation and violence are produced only by a greater concentration or virulence in the latter, joined to a greater intensity of atmospherical heat, acting on persons little accustomed to bear it, whilst they retain the excitability of cold or temperate climates, together with an habitual disposition to generate that portion of animal heat which such climates require. They will have seen that the yellow, like other marsh fevers, is always exasperated by great heat, and extinguished or mitigated by cold; that, between the tropics, it prevails *simultaneously* with the milder forms of marsh fevers, violently attacking *strangers* from cold climates, whilst the natives or long residents are at most only subject to intermittents or mild remittents. They will have also seen, that in temperate situations this disease, in the early part of Summer, before the atmosphere has become intensely hot, is commonly preceded by, *or rather shews itself in*, the forms of intermitting or remittent fever; and that when, being exasperated by excess of heat, it has assumed, and for some time prevailed under, the appearance of an epidemic yellow fever, the accession of cool weather speedily reduces it again to its milder forms, and that a freezing temperature soon puts and end to its appearance, even in those forms, as it commonly does to other fevers occasioned by exhalations from marshes, *and to no others*. And they will also have seen, that the common bilious remittent of hot climates, which is universally admitted to be the effect of

miasmata, differs from the yellow fever only by being a little less violent; that, at the utmost, their symptoms vary only *in degree;* and that, in truth, even this difference is often so imperceptible, that the College of Physicians in Philadelphia, when anxious to assign a distinction between the *yellow* and the *bilious remittent* fevers, thought it necessary to allege *one,* which is not only *invisible,* but without *existence,* i. e. contagion. In fact, there is no difference between these fevers, excepting the greater violence, and, consequently, greater danger, attending the former than the latter; for the yellow colour appears in both; and supposing the fatal *black vomit,* with profuse hæmorrhages and petechiæ, to occur only in what is called *yellow* fever, (though they are sometimes seen in fevers known and admitted to arise solely from marsh effluvia,) they cannot be included among its essential or distinguishing symptoms, unless *death* be also considered as essential to the disease. Nor can any exasperation of symptoms, which has been preceded by a great degree of heat, give any reason to suspect that a fever whose symptoms are thus exasperated, did not originate from miasmata, because such an exasperation is invariably produced by that *cause* in marsh fevers; and by it they are susceptible of the most dangerous and malignant appearances.

" With so many proofs of identity in their cause, and of the nearest affinity in their symptoms and reciprocal conversions into each other, as well as in their effects on the human body, and their changes by heat and cold, &c. it would be highly unreasonable not to consider them as being only *varieties of one disease.* And I think, with Dr. Rush, that we might as well ' distinguish the rain which falls *in gentle showers* in Great Britain, from that which is *poured in torrents from the clouds in the West Indies,* by different names and qualities, as to impose *specific* names and *characters* upon the different *states* of bilious (or marsh) fever.' "*

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* That the fatal endemic of the West Indies is the highest grade, or most aggravated form of tropical fever, is now, with some exceptions, the general conclusion of the best informed practitioners. Besides many authorities, incidentally cited on this point, in the course of this discussion, it is also the opinion of the following able physicians, whose opportunities of witnessing fever in various climates, have, from their official situations, been very extensive, viz.—Drs. Pinckard, Cole, Gray, Muttlebury, Denmark, Veitch, Mortimer, Macmullin, Vance, Forbes, &c.—*See Bancroft's Sequel, and also a very good paper by Dr. Musgrave, Medical and Chirurgical Transactions, vol.* ix.

Some highly respectable observers are also of opinion, that the modifications impressed on the endemic febrile cause by the influence of locality and of season, are manifested not only by variety of type, but also by the production of the dysenteric and ulcerative forms of fever. Dr. Jackson remarks, " In the interior of most of the islands, at an elevation of five or six hundred feet above the level of the sea, among a series of mountainous ridges, not exposed directly to currents of exhalation from swampy and low grounds, the form of disease is sometimes intermittent, sometimes remittent, or continued, but more generally dysenteric, for the most part slight and

The fifth part commences with a Chapter on Typhus or Contagious Fever: a term vaguely applied at present to designate generally all low or slow fevers arising from great fatigue, cold and damp habitations, unwholesome or insufficient food, anxiety, grief, fear, and other depressing passions and debilitating causes, having no connexion with contagion, nor any power of producing a contagious disease, but which should, the author thinks, be restricted to a fever *sui generis*, strictly contagious, and derived exclusively from its own specific cause, or contagion. I have before stated Dr. Bancroft's opinions on the origin and propagation of febrile contagion, and pointed out wherein he differs from the generally received notions on this subject. The difficulty of determining whether any individual case of typhus has originated from some of the causes which have usually been considered adequate to its production, or whether common low fever may have degenerated into typhus, as has been sometimes supposed, must be very great, if, as the author is inclined to believe, an interval of five or six months may sometimes elapse before the actual production of fever by typhus contagion received into the system, especially if the Summer should intervene previous to an attack; in which case, the occurrence of fever would, the author thinks, almost always be postponed until the following Winter. Under such circumstances, I do not see how the question is to be determined satisfactorily, since it is nearly impossible to demonstrate that any person has not been unconsciously exposed to typhous contagion many months before, whilst his fever has apparently been produced by fatigue, cold, &c.

The history of contagious fever is involved in great obscurity: nor is it until lately that it has been observed and distinguished with any tolerable accuracy. Typhus differs in almost every particular from yellow fever; it is properly a disease of cold climates; the heat, which is favourable to yellow fever, soon puts an end to the typhous contagion; whilst the cold seasons and climates, which stop the ravages of yellow fever, are the most prolific in fevers of contagion. The susceptibility to typhus is also in direct opposition to that for the yellow fever. We have seen that persons going

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manageable, sometimes violent and dangerous. The eruptive and ulcerative, or sore leg, belongs also to the elevated situation, especially in the dry season." *Sketch of Febrile Diseases*, p. 8 —On the conversions of the febrile cause, Dr. Lempriere thus expresses himself—" In low, flat situations, where, during the rainy season, the water did not readily pass off, I found active continued and remittent fevers, and obstinate and fatal intermittents to prevail. In the vicinity of Lagoons, where water was always present, dysentery and common intermittents were observable. In the first elevation of mountains, mild intermittents, in the second elevation obstinate ulcers, and in the third and still higher elevation, neither fevers, dysenteries, nor ulcers were common."—On the difference of situation and elevation, as favouring a tendency to fevers, dysentery, or ulcer, Dr. Porter, who served in the West Indies at the same period, holds an opinion very similar to that of Dr. Lempriere.

from cooler into hot climates, are more obnoxious to the yellow fever than the natives or long residents in those climates; whereas, "those who by birth and residence have been long habituated to intertropical climates, are, when they remove into the cold, particularly susceptible of the action of typhous contagion, if exposed to it. The accession and progress of the symptoms, also, are very different in the two diseases; typhus is generally accompanied with less mortality, and the derangement which it occasions in the system is much less permanent and mischievous than that which accompanies or results from even the remittent fever of Europe." As a proof of this, the author compares the events produced by typhus in the British army, subsequently to the return of the troops from Corunna in 1809, with those which attended or followed the expedition to Zealand in the same year, when our soldiers had been exposed to the causes producing the remittent fever. It appears that in the former instance the deaths did not exceed one in ten of the sick, notwithstanding some disadvantages of accommodation and treatment under which they laboured; whereas, on the Zealand expedition, the deaths were but a small fraction less than one in eight, although no such disadvantages existed; and "the recoveries much more tedious, relapses perhaps one hundred times more frequent, and very often followed by permanent obstructions or morbid alterations of the viscera, ending in dropsy, or other chronical affections."

Dr. Bancroft, having been employed with the troops from Spain labouring under typhus, availed himself of the opportunity of ascertaining the time which the contagion may remain latent after its application to the human body. For this purpose he procured returns of the orderlies and nurses who had attended the sick in question, and had been afterwards attacked with the same fever; and also an account of the time when the attendance of each began, and of the interval which succeeded previous to the attack. The sum of his observations is thus stated.

"It results, therefore, from this statement, that among the ninety-nine orderlies and nurses, who had probably *not* been exposed to the contagion before their attendance on the sick commenced, the *earliest* attack was on the 13th day, and the *latest* on the 68th; but these returns were made up about the 20th of April, and it appears that some who had escaped till that time, were afterwards attacked."

The second Chapter contains Observations on Dysentery, wherein the author contends against this being a disease of contagion, except when it exists together with typhus fever (a connexion, however, he seems much inclined to doubt ever taking place); but he asserts that, for the most part, it is produced by the same causes which give rise to remittent fever, viz. heat and marsh miasmata. The circumstances which determine the morbid influence of marsh effluvia towards the intestines, so as to excite the disdisease in question, rather than intermitting or remitting fevers, do not, he thinks, seem to be yet well understood. Various facts are stated by Dr.

Bancroft, proving the non-contagious property of dysentery, and shewing that it is frequently epidemic at the same periods and in the same places with marsh remittent fever, and the probability of their acknowledging the same causes is increased by the alternate *succession* of one disease to another, which so often takes place. The author's treatment of the disease is accordingly founded upon this view of its nature and cause; and, as his directions on this head are comprised in few words, I shall here give them.

"As in this disease there is manifestly a morbid determination of febrile or inflammatory action upon the intestines, I think, and have always found it beneficial, speedily to counteract this disposition, and produce an opposite determination, so far at least as to create a salutary distribution of the blood, and of the living power, throughout the body, and especially upon its surface, by suitable diaphoretics, combined with opium, in small doses; by the application of flannels immediately to the skin, and more especially round the abdomen; and, in urgent cases, by the warm bath (continued for the space of an hour, if the patient can bear it so long), warm fomentations, and especially blisters upon the belly, taking care, at the same time, to promote sufficient evacuations by stool, to relieve the intestines as much as possible from all irritation and uneasiness, which they might suffer by a retention of hardened fæces or scybala, and other matters. For this last purpose the neutral purging salts, with manna, are proper, or a mixture of the oleum ricini, with the juice of a ripe orange, and a little mucilage of gum-arabic, which will agree better with most stomachs, and prove equally efficacious; emollient purgative clysters may also be employed. Should the disease be attended with considerable fever, care must be taken not to increase it by a too frequent use of diaphoretics and opium. When the disease, by long protraction, has occasioned ulcerations of the intestines, and more especially when it is complicated with an affection of the liver, calomel should be preferred as a purgative, and it should also be employed with opium, so as to excite a soreness of the mouth." In addition to this, the food should be light and easy of digestion; when the patient has any particular craving, it may almost always, the author says, be safely indulged. The last Chapter is on the Plague.

Here I shall conclude the present section, and introduce an able analysis of Dr. Bancroft's subsequent work, entitled, "A Sequel to an Essay on Yellow Fever," drawn up for the *Medico-Chirurgical Journal* for Feb. 1818, by my late esteemed friend Mr. Sheppard, of Witney, a gentleman of much experience and of sound judgment. It stands in the plural number, as originally written.

A Sequel to an Essay on the Yellow Fever, principally intended to prove, by incontestible Facts and important Documents, that the Fever called Bulam, or Pestilential, has no existence as a distinct, or a contagious Disease. By EDWARD NATHANIEL BANCROFT, M.D. Fellow of the Royal College of Physicians, Physician to the Army, and late Physician to St. George's Hospital. London, 1817, 8vo. pp. 487.

THE medical history of our West India possessions presents a melancholy detail of a vast destruction of human life from the ravages of the disease which forms the subject of the volume before us; and the painful feelings which the retrospect is calculated to produce, are certainly not lessened by the reflection, that the state of active and protracted warfare in which we have been involved, has, in addition to the other miseries which have flowed from that source, principally contributed to swell the catalogue of victims to this scourge;—that many thousands of our brave countrymen have escaped the fury of battle, and all the varied dangers "*per mare, per saxa, per ignes,*" incidental to the life of the soldier and sailor, only to fall an inglorious sacrifice to this insatiate foe! Nor have its visitations been limited to the transatlantic shores alone; the inhabitants of many of the southern parts of Europe have, on various occasions, felt severely the pressure of affliction and mortality from this widely extended cause. While, in common with every feeling mind, we regret the discrepancy of opinion respecting its origin and nature, which has prevailed among the only legitimate judges of the question, and condemn the asperity and intemperateness in which the contending parties have too frequently indulged, we cannot but rejoice in the prospect which now opens on us, of the discussion being at length brought to a speedy termination. The overwhelming mass of evidence which Dr. Bancroft has now brought forward, in disproof of the existence of contagion in yellow fever, will, we confidently anticipate, put to flight a chimera, which has, in too many instances, seduced the attention from the true sources of the disease. The periodical publications, it is true, have lately teemed with refutations of the doctrine of contagion; but in the fleeting and insulated form of those communications, much of their weight and authority is necessarily lost. We, therefore, hail with real satisfaction the appearance of a work containing an invaluable store of original and highly respectable documents, collected and arranged with no ordinary research and ability, and supported by argumentative talents of the first order. Since the appearance of the author's former volume, two publications have issued from the press in support of the distinct nature and contagious quality of the "Bulam," or yellow fever; and by one of the writers a claim has been preferred to the discovery of the alleged peculiarity of its attacking the human frame only *once*. With the view of effecting the subversion of these doctrines, Dr. Bancroft has again entered

the arena; and on all the principal bearings of the question, we conceive that his triumph is complete. The quantity of matter accumulated in the present volume, almost defies an adequate analysis; but as, from the analogy of our opinions on the subject with those of the author, we find very little to oppugn, or to criticize, we shall endeavour to lay before our readers a condensed view of the most important topics under discussion.

We are informed in the Introduction, that the Lords of the Privy Council deemed the opinions of Dr. Pym of sufficient importance to induce them to make application to the College of Physicians for information on the two chief points which he has endeavoured to establish:—the contagious nature of yellow fever, and the peculiarity of its attacking only once. The reply of the College, although on the whole favourable to Dr. Pym's pretensions, was undecided, as they properly alleged, for want of experience in the disease. Application was then made by the Council to the Army and Naval Medical Boards. Concerning the communication from the former Board, Dr. Bancroft has not been authorized to give any information. The latter, having collected the opinions of those naval medical officers whose experience enabled them to adduce facts and observations in support, or in refutation of Dr. Pym's propositions, transmitted a concise analysis thereof to the Lords of the Council, together with the original Reports. To these their Lordships have been pleased to allow Dr. Bancroft free access, and from that source a large portion of the evidence contained in this volume is derived.

The author begins his inquiry by controverting the diagnostics by which Dr. Pym distinguishes his Bulam from the bilious continued, and bilious remittent fevers; and we are of opinion, that he has undeniably proved that no *specific* difference exists between these forms of fever; that the points on which Dr. Pym has attempted to found a diagnosis, are merely differences of degree, and, that (excepting the last, the black vomit), they are not peculiar, uniform, nor essential to the fever in question. Indeed, it appears to us, that they obtain more or less in most dangerous fevers, as, we conceive, must be evident not only to all personally and extensively conversant with yellow fever, but even with fever in general; and further, that Dr. Pym has himself proved the futility, and destroyed the foundation of such diagnosis (if we were to grant his assumption, of which, however, an *ipse dixit* is the substitute for proof), by asserting, that even Dr. Rush himself mistook the bilious remittent for the Bulam Fever.—*Pym's Obs. p.* 209.

Of these alleged diagnostics, the two first, the appearance of the eyes, and the nature and seat of the head-ache, the author satisfactorily shews, from various authorities, to be vague and indeterminate, and, therefore, perfectly useless in diagnosis. With regard to the absence of remissions, constituting the third diagnostic of the Bulam, Dr. Bancroft adduces a mass of evidence to prove "the simultaneous appearance of both forms of the

fever, and their reciprocal *conversions* into each other at particular places and seasons; together with the invariable appearance of remittents at the same places, both *before* the high atmospheric temperature has operated sufficiently to give them the continued form, and also *after* the effects of this high temperature have ceased to exist." Further, Dr. Pym has derived the epidemics of Gibraltar by importation from those of Cadiz, Malaga, and Carthagena, and has thereby identified them with the fevers of those places; and Sir James Fellowes states, that Arejula, Gonzales, and Flores, are "the three most eminent physicians in Cadiz, and he believes in Spain." Now, unfortunately for this principal diagnostic, all those writers distinctly mention remissions in their descriptions of the Spanish epidemics; and as regards the fever in Gibraltar, remissions are proved by evidence of seven medical officers of that garrison in the epidemic of 1814. The fourth, or the infrequency and paleness of the yellow colour of the skin, cannot be viewed otherwise than a relative expression; and it will be sufficient to state, that, from the accounts of Sir James Fellowes, Sir Joseph Gilpin, Mr. Donnet, and others, the suffusion of the skin is observed in every intermediate shade between a lively yellowness, and a dingy, or dark hue. The author also rejects the fifth diagnostic, the duration of the disease, on the principle of the want of uniformity. Dr. Pym says, it runs its course in from one to five days; it is admitted, that it commonly does so in its most aggravated form; but it is proved from Arejula, Sir James Fellowes, Dr. Burnett, Labat, and Dr. Chisholm, that it often continues much longer: further, Dr. Pym states, that "the *remittent* sometimes proves fatal on the second or third day;" and, according to Dr. Hunter, it even runs its course in twenty-four hours. We have ourselves witnessed death on the third day, in a violent remittent imbibed in the month of September, in one of the most *northern* rivers of the United States. Lastly, respecting the sixth alleged diagnostic, the gangrenous state of the stomach, and the appearance of black vomit, Dr. Bancroft exposes the futility of such criteria, the first of which can only be known after death; and the latter "is the almost unerring harbinger of death." The chief value of a diagnostic is to enable us to ascertain the true nature of a disease; but this refers to its consequences only. Neither is the black vomit peculiar to the continued form; for the authorities of Pringle, Cleghorn, Hunter, Rush, and Burnett, prove its occurrence in the remittent.

"I shall only add, concerning this black vomiting, that as it is a mortal symptom, never occurring, it may be said, *in those who recover*, and one which is often wanting among those who die, its appearance in this disease must be much rarer even than death; and this circumstance, joined to that of its *not* being 'peculiar' to the fever in question, render it very unfit to be produced as a diagnostic thereof." p. 30.

Adverting to the inconsistencies contained in Dr. Pym's account of the

condition of the pulse and skin, "for which," he says, "the Bulam fever is remarkable," the author thus expresses himself:—

"Descriptions of symptoms being simply records of natural events in disease, which stand unalterable, however opinions about them may change, will the confusion, the inconsistencies, and errors, every where apparent in Dr. Pym's attempt to frame a diagnosis for the Bulam fever, be deemed very excusable in one who claims merit for discovering peculiarities therein, which had escaped the sagacity and penetration of all other observers?"

We apprehend that sufficient has been said to shew that the question of the continued form of fever, or the Bulam, is merely one of degree; that the peculiarities which are said to distinguish the Bulam from all other fevers, do not exist; and that, therefore, the supposed distinct fever must be as imaginary as the peculiarities themselves.*

The second chapter is devoted to the consideration of other alleged peculiarities, more especially the non-liability to a second attack; which it is stated was brought under the notice of the Privy Council, in consequence of an application from Dr. Pym.

The merit of originality in this supposed discovery is disputed; Sir James Fellowes awards it to the Spanish practitioners generally; Dr. Pym claims it as exclusively his own, and fixes on the 20th day of October, 1804, as the period when that event took place in the garrison of Gibraltar.—The security he represents to be similar to that which an individual acquires by having undergone the small-pox. Now, Professor Berthe, in his "Précis Historique," &c. published in 1802, gives an extract of a printed letter, dated at Cadiz, May 6th, 1802, in which the writer plainly states, that, like small-pox, after one attack, a future seizure rarely occurs. This opinion, however, the Professor designates as fallacious and dangerous. In the epidemic of Cadiz, also, in 1800, towards the decline of the fever, the civil authorities of that place grounded their police measures on this opinion:—

"Guards were stationed at the gates, to exclude all persons from entering the city, who did not produce certificates of having already had the fever."

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* Dr. Musgrave, of Antigua, who has also successfully controverted all Dr. Pym's principal positions, remarks:—"Had Drs. Pym or Gilpin, or any one holding their opinions, practised in Antigua during the late epidemic, still prepossessed with the idea of black vomit being distinctive of yellow fever, I venture to assert, without fear of contradiction, that he or they (spite of every preconceived notion), must in candour have admitted, that a disease at least answering in every respect the description given by themselves, could ostensibly be produced by miasmata alone; and that, in comparing a mass of cases occurring in town and country, with Creoles and Europeans, a continued chain could be traced, link by link, from the most concentrated form as it invades new comers, to the simple intermittent, which we so frequently meet with among the slaves." p. 123.—*Medical and Chirurgical Transactions*. vol. ix.

Arejula had likewise pointed out the security afforded by an attack of the fever in the epidemics of Medina Sidonia, Malaga, and other places in Spain; and states, at page 319, that

"At these places, and almost every other, he selected, as assistants to the sick, those who had previously undergone the epidemics."

So much for the originality of the alleged discovery, to the credit of which, even had it been confirmed by experience, we apprehend, on the principle of "*suum cuique*," Dr. Pym had no claim. As to the reality of this supposed "peculiarity," we consider the evidence adduced by Dr. Bancroft from the reports of the naval medical officers, before adverted to, as well as the result of the examination of the different journals of naval surgeons employed in the West Indies, to be perfectly conclusive in the negative. This opinion is corroborated by the answers of five army surgeons, and three assistant surgeons of the garrison of Gibraltar, during the epidemic of 1814, to the questions proposed to them by Deputy Inspector Frazer; they all bear distinct testimony to second attacks.

We can only briefly notice the author's exposition of the frailty of Dr. Pym's alleged proofs of absolute immunity after one attack. In the instance of the epidemic of Gibraltar, in 1804 (on which the supposed discovery seems to have been founded), it is stated, that one hundred and twenty-two men who had escaped the fever, were found, on inquiry, to have been in the West Indies at some former period, which is inferred to have been the cause of their exemption; and that the 57th regiment, which had recently served in Trinidad, was introduced into the garrison, during the prevalence of the epidemic with impunity. These are alleged to be proofs of the Bulam fever not attacking a second time; but both instances obviously involve the assumption, that all who have visited the West Indies have necessarily undergone an attack of yellow fever:—a fallacy we need not stop to refute. The instance of the men of the 10th regiment, which acquired their security by service in the *East* Indies, is still more palpably defective; because Dr. Pym having laboured to prove that the Bulam has never appeared in the East Indies, the men of the 10th regiment could not on his own principles have obtained their immunity by previous attacks.

Indeed, it appears to us, that Dr. Pym has not steadily contemplated the security, constituting his alleged discovery, in a determinate point of view. In general, he compares it to the almost absolute immunity which an attack of the small-pox confers; but, at other times, he plainly speaks of it as (what in truth it amounts to) merely a relative security; for instance, in his account of the epidemic yellow fever of the 70th regiment in Martinique, in 1794, he says every individual in the regiment was attacked; and, that three officers who had been several years in the

West Indies, some time before, had it in so mild a form, as to make it unnecessary for them to be confined to bed:—again, the regiments in Martinique that had been some years in the West Indies, he says, were attacked (in 1794) equally with the corps lately arrived from England; but *with this difference,* that the former "*suffered a comparatively small mortality:*" And further, in the above-mentioned case of the 10th regiment at Gibraltar, he states, that "eight officers who had been in India, were attacked with the fever, and all recovered.—Seven officers who had not been in India, had the disease in so different a form, that five of them died." These we take to be fair illustrations of relative security, acquired by habituation to, or seasoning in, a tropical climate: and prove, that in order to obtain such comparative security, it is not necessary that the individual should have passed through an attack of yellow fever; while, on the other hand, we may safely trust to the evidence adduced by Dr. Bancroft, to establish that one, or even a repetition of attacks, does not confer *absolute* non-liability.

We have been somewhat diffuse on this point, from a sense of its importance; and, because we are anxious to exhibit the merits of the case in as distinct a form as our observation of the subject permits; and we refer to the evidence itself in support of our opinion, that the supposed non-liability to a second attack, so far from resembling the immunity after small-pox, is strictly a relative security, to be acquired as certainly, though more gradually, by tropical residence (which involves habituation to the remote cause), as by having passed through an attack of the disease:—a condition of the habit which confers security only when the concentration and force of the endemic causes do not exceed the degree to which the individual may have been previously habituated;—and, lastly, a mean of exemption which is liable to be destroyed by (e converso) the regenerated susceptibility which a return to, and residence in a northern climate effectuate. That the exemption is absolute after one or more attacks, we consider to be perfectly, and most satisfactorily disproved; and we cannot well abstain from expressing our astonishment how Dr. Pym could ever have entertained such an idea, much less have vaunted it as a *discovery;* for very little reflection might have shewn him, that it *could not* have escaped the observation, but *must* have been evident to, and eagerly caught at by those who had passed a series of years amidst yellow fever, had such absolute immunity any existence. The facts included in the documents now brought forward by Dr. Bancroft, will, we cannot doubt, be deemed decisive; and consign to oblivion the premature notion of a discovery in a supposed "peculiarity," which he has proved does not exist; and which, even for a moment supposing its existence to be any thing more than relative, had been pointed out, and acted on by the Spaniards, many years previous to the 20th October, 1804.

Dr. Fergusson, Inspector of Military Hospitals in the Windward

Islands, in his communication to the Army Medical Board, observes on this point,

"Another piece of doctrine has been promulgated from the writings of the authors above alluded to (Drs. Pym and Fellowes); that the yellow fever cannot be received by the same subject more than once. Of this we again, who live amongst yellow fever, not only know nothing, but we see it contradicted by the daily experience of our lives."—*Page* 87.

We have always protested, with Dr. Bancroft, against the subtilty of making the black vomit a criterion of the Bulam fever, and regulating the admissibility of the proofs of future attacks by that assumed standard. By acknowledging the legitimacy of such a criterion, as few or none recover after that symptom has appeared, a difficulty nearly tantamount to impossibility is incurred, of ever adducing, in the course of even a long life, an unobjectionable instance of a second attack. When black vomit, and its usual immediate sequel, death, take place, the patient is relieved from future attacks of any kind; but in less aggravated forms of yellow fever, where there has been no black vomit, and the patient has recovered, then, in the event of a second attack, say the advocates for the Nova Pestis, the original one was not a case of Bulam, for one of our diagnostics was wanting; there was no black vomit!—and vice versâ. Accordingly, we find this subterfuge incessantly resorted to. Against such sophistry, arguments are vain; and facts, for the reasons we have assigned, difficult to be applied. The Report of Inspector Fergusson from Barbadoes, amongst other cases of second attacks, contains, however, one decisive instance of even black vomit occurring twice in the same individual. A patient of Dr. Caddell, a physician of the greatest experience in Barbadoes, miraculously recovered from yellow fever with distinct black vomit, "and died some years afterwards of the same disease, and with the *same symptoms*."—Against a fact of such decisive import, we know not what reply can be opposed, unless it be, "*Non persuadebis, etiamsi persuaseris.*"

In a rejoinder of considerable extent, Dr. Bancroft adverts to Dr. Pym's examination of the authorities he has adduced in his Essay against the doctrine of contagion. He complains of a disingenuous and partial selection of those authorities for that purpose; and expresses his conviction, that they have passed the ordeal without injury.

"Here Dr. Pym closes the account of what he terms my authorities; and he manifestly intends to have it believed, that he has noticed and refuted *all* those which I had adduced; when, in fact, he has completely shunned even the mentioning of nine-tenths of them. The few whom he notices were obviously selected only because they had said or admitted something capable of being distorted contrary to the real and sincere meaning of each; and in effecting this distortion he exults, as 'having, by cross-questioning my witnesses, brought out *the truth*,' and 'convicted me upon my own evidence:' although, in regard to the great body of those

who are more properly my witnesses, he is so far from having cross-examined them, that he has not even looked them in the face ; and my readers, I firmly believe, will be convinced that he has not been able to invalidate or weaken any *one* testimony or opinion which I had alleged to prove the fever in question to be void of contagion." Page 110—111.

A similar complaint is preferred of an equally uncandid and partial selection of some of his evidences against contagion, for the purpose of examination ; and the irrefragable character of the remainder is thence very justly inferred. We think it but an act of common justice to Dr. Bancroft to insert, in his own words, the recapitulation of the evidences against contagion, contained in his former volume, which Dr. Pym has not thought proper to oppugn, or even to notice ; leaving our readers to draw their own inferences as to the probable motives for such cautious proceeding.

" I have now examined all that in any way merited notice of what Dr. Pym has advanced against my authorities and arguments, with the exception of some circumstances relative to Cadiz and Gibraltar, which are reserved for future consideration ; and I cannot but believe that my readers will have been convinced of the fallacy of those principles upon which he has endeavoured to explain, or rather to evade, my inferences, and of the abortiveness of his endeavours to invalidate, in a single instance, either my testimonies or my reasonings. There remains, besides, a great mass of evidence of which he has studiously avoided even the smallest notice ; and this must, of course, be considered not only as subsisting in full strength, but as having been deemed by him unquestionable and invulnerable : for otherwise, with his dispositions, and the latitude of every kind in which he has indulged, it may be presumed, that it would not have been left without some hostile attempt. To this evidence, therefore, I refer my readers with confidence ; and more especially to the very accurate and respectable one of Dr. James Clarke, at pages 332, 333, 334, and 760, 761 of my Essay ; and that of Mr. Young, Inspector-General of Hospitals, and of all the superior medical officers of the army under Sir Ralph Abercrombie in the Windward Islands, p. 334, 335 ; those of MM. Desportes and Valentin at St. Domingo, p. 338—341 ; that of Dr. Hector M'Lean, with the opinions of Drs. Jackson, Scott, Wright, and Gordon, and nearly, if not all, the other medical officers of the British army in St. Domingo, p. 341, 342 : that of Dr. Hume, p. 346, 347 ; those of Dr. Walker and of Dr. Grant of Jamaica, p. 350, 351; that of Dr. Ramsay, and of all the medical practitioners of the State of South Carolina, declared unanimously at a General Meeting in Charleston, p. 355, 359 ; that of Dr. de Rosset of Wilmington, in North Carolina, p. 359 ; the opinions of Drs. Valentin, Taylor, Hansford, Selden, and Whitehead, in Virginia, p. 360, 362 ; that of Dr. Davidge of Baltimore, p. 363, 366 ; that of Dr. Vaughan in the state of Delaware, p. 367, 369 ; the opinions of many physicians

at Philadelphia, between pages 372 and 386 ; and at New York, p. 387, 389 ; and those of Dr. Coit of New London, Dr. Wheaton of Providence, and Drs. Warren and Brown, of Boston, p. 401, 406. I request also the attention of my readers to the facts partly stated, and partly recapitulated between pages 406 and 430 ; and, finally, to the very important official message from the President of the United States on this subject to the two Houses of Congress, p. 430, containing such an uncontradicted and incontrovertible statement of facts, as ought, in every unprejudiced mind, to remove every suspicion of the existence of contagion in the yellow fever, at least in that part of the world." Pages 120—122.*

Although Dr. Bancroft considers this quantity of uncontradicted evidence to be " more than sufficient to overthrow Dr. Pym's superstructure, more especially as the foundation of it has been removed in the first chapter of the present publication," he adduces a multiplicity of additional facts and authorities in proof of the local origin of yellow fever, and of its being destitute of the quality of contagion. Among other documents, one from New York is not the least curious, which proves from the contagionists themselves, *that a fever, in every respect resembling the Bulam, prevailed in that city nearly two years before the arrival of the Hankey at Grenada !*— Page 124—126.

In illustration of the identity of cause of the continued yellow fever, and of the recurrent forms, the following extract from the Official Report of Dr. Dickson, the late able physician to the Leeward Island Fleet, will be duly appreciated.

" At Barbadoes and Antigua, I had generally seen the disease of an ardent *continued* form, and did not fully understand why authors talked of a bilious *remittent* yellow fever, until after the capture of the French and Danish islands. But the anomalies of fever, the shades and changes which it assumes according to the intensity of the exciting causes (which *there* were *purely* and *wholly local)*, the state of predisposition, or the spot of residence, could no where be more strongly portrayed than in the destructive epidemic of Mariegalante in the Autumn of 1808, from the most con-

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* The above references include the opinions of Drs. Caldwell, Miller, and other eminent physicians. Several other very recent authorities might be adduced, who consider the yellow fever of endemic origin, and concur in ascribing it to local causes and atmospherical influence—but to these a brief allusion only can here be made : see the Treatises of Doctors Girardin, Irvine, Reese, Le Fort, &c. and the Accounts of Doctors Watts, Revere, and other writers, in the different periodical works lately published in the United States. Dr. Watts, speaking of America, observes, " from one end of the Continent to the other, it has been officially announced during the last season, that the yellow fever was not communicated from one person to another, and not even in hospitals where the sick have been admitted in great numbers."—*New York Med. & Surg. Register, part* ii. *vol.* I., 1820. See also, lately republished, the work of the experienced M. Devèze. Paris, 1820.

centrated marsh miasmata; when the different types of fever were *controverted* into each other, of the *worst* and *most aggravated species* I have ever witnessed. Some were affected with the *highly concentrated* yellow fever in the continued form; others with *comatose remittents* or *intermittents*, the exacerbations of which were so violent as to carry off a patient in two or three paroxysms; while others sunk into a low protracted character of fever, resembling typhus." p. 143—144.

After stating the opinions of the naval medical officers who reported on the question of contagion, Dr. Bancroft gives the following summary of them; from which it will be seen that the evidence against contagion is as great and uniform, as perhaps can ever be expected on any disputed point.

"Having stated the opinions delivered in the Reports transmitted to the Privy Council, it may be proper to give a summary of them; and I will therefore mention that, of the twenty-four gentlemen from whom these reports were obtained, *three* (Mr. Gregory, No. 12, Dr. Kein, No. 15, and Dr. Magrath, No. 17), have omitted the statement of any opinion on the subject of contagion, as connected with the fever in question; *three* others (Dr. Weir, No. 1, Dr. Blair, No. 2, and Mr. Tobin, No. 21), have expressed their opinions that *it is contagious: one* of them (Mr. Brien, No, 20), declares his belief that, in individual or solitary cases, it is 'incapable of communicating itself to those who are contiguous,' but 'that, when several were labouring under the disease at the same time, he believes it to be highly contagious.' And, *another* gentleman (Dr. Gardiner, No. 9), appears to think, that *local* causes contributed at least as much to the production of the fever in Gibraltar, in 1813, as contagion. Of the remaining *sixteen*, the majority have *absolutely* and *positively denied* the existence of any contagious property in this fever; and the rest have declared their belief, that it is not *naturally* or *properly* a contagious disease, although several of them are inclined to believe that it may (as they suppose to happen with most other diseases) acquire a contagious property by crowding, filth, &c. Most of the sixteen gentlemen, who declare that the fever under consideration is *not contagious*, have alleged decisive facts to support their declarations, some of which I have already quoted; and I shall hereafter have occasion to notice some of the others." p. 178—179.

When we reflect that this evidence in great part proceeds from physicians to fleets, and surgeons of hospitals, who have lived among yellow fever for a series of years; and, that the reports here adduced are few indeed, when compared to the great body of medical officers, who, with very few exceptions, we have had occasion to know, are uniformly opposed to contagion; when to these are added the opinions of Drs. Fergusson, Muttlebury, and Adolphus, who have long held official situations of the highest responsibility in the West Indies; when the number and length of service of those who have given their opinion so decidedly against contagion are considered

—the preponderance is immense; especially as far as the yellow fever of the West Indies is concerned.

It would appear, from the report of the College of Physicians to the Lords of the Privy Council, that they entertain the opinion that yellow fever *may* prevail in the British Islands. They express their belief that "the cold of our climate would not prove a preservative against the contagion" (of yellow fever), because "it appears that during the months of October and November, when the fever raged at Gibraltar, Malaga, and Leghorn, the temperature was greatly below the average heat of our Summer." This inference we beg leave to dissent from; and in extenuation observe, that the College, in deducing such conclusion does not appear to have been aware of the necessity of a certain *preceding duration of high temperature*, which experience proves to be indispensable to the development of epidemic yellow fever. Within the tropics the requisite degree of heat is never absent: and in those places, without the tropics, which have been occasionally visited by the disease, as North America, and the Spanish Peninsula, the meteorological observations of the various years in which it has prevailed concur in the pre-existence of high atmospheric temperature, for many weeks before the appearance of the epidemics. Temperature to this requisite extent seldom obtains in this climate; and when it does occur, is very transitory. Such evanescent influence is totally inadequate to the production of the disease; and while, from insularity, or other causes, our climate retains its *mutable* character, we may, without temerity, discard all apprehensions of the existence of yellow fever among us. In corroboration of the steady pre-duration of high atmospheric temperature, as the "*sine quâ non*," of the development of epidemic yellow fever, the following extract from a provincial newspaper is not inapplicable.

"It has been ascertained from tables and records for the last twenty-four years, that, in Philadelphia, the yellow fever does not prevail when the months of June and July do not exceed 70 degrees; but that in every Summer since 1795, when the average heat of these months has exceeded 79 degrees, then the fever has raged; and that it has been most fatal in those years in which the thermometer has indicated the greatest altitude." —*Hampshire Telegraph*, Nov. 1, 1817.

In several of the Reports transmitted to the Privy Council, a belief is expressed that the yellow fever, although it does not originate in contagion, or legitimately possess such quality, *might* acquire it under accumulation of the sick, and deficient ventilation. The author admits that the disease may be aggravated by such circumstances; but unconditionally denies the possibility of its acquiring such fortuitous contagious power. On this point (as far as the *tropical* endemic is concerned), we concur with Dr. Bancroft; because, on reference to our experience of many years in the West Indies, we cannot charge our recollection with any instance of yellow fever having

manifested such contingent property of contagion, *under any circumstance*. One source of fallacious deduction on this point, seems to have been the too narrow limitation of the range of predisposition; for example, a ship enters an unhealthy port; her men imbibe the local noxious exhalations, and are exposed to the other remote causes of fever; she sails with a long list of fevers; the attacks continue at sea, in the order of predisposition, while the local source of the fever has been left behind some hundreds of miles, and is, perhaps, forgotten; the sick are unavoidably crowded, and at length, in the absence of the original cause, the seizures are ascribed to a contagious property acquired by accumulation; when, in fact, the various periods of attack should have been referred to the varied degrees of predisposition. In offering this explanation in favour of the ultra opinion, we merely state the result of our observation. Neither can we admit the justice of the inference, that such alleged contingent property is favourable to the doctrine of a peculiar and distinct disease, the Bulam; which its advocates contend is contagious *ab origine*, independent of those fortuitous circumstances under which only some have supposed (not proved) the yellow fever to become contagious. Moreover, we imagine, that those most inclined to this opinion, will not agree with Mr. Pym, that it can be conveyed and re-conveyed across the Atlantic, and from one place to another; because we conceive that such a property, *if ever possessed*, is not of that permanent and imperishable nature to admit of transportation whenever the contagionists wave their wand; but is dependent upon a casual, local, and transient coincidence of agency; we, therefore, agree with Dr. Bancroft, that it proves nothing in favour of Dr. Pym's view of the subject, its nature or origin.

We are glad to find that the author has now bestowed due attention on a prolific source of fever under high temperature, the noxious exhalations from the foul hold of a ship. By disregarding this common cause of fever, a contagious origin has been erroneously assigned to fevers, which, making their appearance without exposure to land influence, could not be supposed to have sprung from an endemic source. Of the frequency of such a cause of even the most aggravated yellow fevers, no one can doubt after perusing the facts contained in the fourth chapter; to which we are the more desirous of directing the attention of our readers because we are of opinion, that they will satisfactorily reconcile several seeming instances of contagious fever, with their true origin, an impure atmosphere from the exhalations from a foul hold. It it needless to dwell on the importance of the distinction; the history of the transports from Carthagena, in which the epidemic of Gibraltar, in 1810, was reported to have been imported, will hereafter be shewn to be a strong case in point. The accounts of the Regalia transport, by Drs. Fergusson and Mortimer, and of the Antelope and Childers ships of war, in which yellow fevers of a destructive order recently prevailed from this

cause, as attested by Dr. Crichton and Mr. Niell, will be read with the greatest interest. The observations of Dr. Fergusson will shew, that had the Regalia arrived *a year later* in Barbadoes, she would probably have enjoyed equal notoriety with the much calumniated Hankey; the late sickness in that island would have been referred to a second African importation in the Regalia, and error thus confirmed. Dr. Fergusson concludes his observations on this subject with the following important remarks.

" I am aware how much I have been favoured by circumstances, and what a different interpretation the facts I have collected would have borne, had the present epidemic that now afflicts the islands (1816) broken out in the ordinary course of seasons *a year earlier*, at the time the Regalia was here; my task would then have been a much more difficult one, for these (facts) instead of assisting me to elicit the truth in the manner I have done, would, in that case, have been turned to the confirmation of error, and the perpetuation of the delusions, in regard to imported contagions." p. 239.

From abundant experience of the danger, we fully coincide with the author in deprecating the practice of heaving down vessels of war, in the West Indies, in the ordinary routine of service, at least; as well from the excessive fatigue and exertion it demands, as because it is a process which requires for its execution, local security; or, in other words, a land-locked, and, therefore, generally an unhealthy harbour. The instances of sickness and mortality from the effects of clearing a foul hold, in an unhealthy harbour, are numberless; Dr. Bancroft relates a remarkable one, amongst several others, in the " highly interesting " Report of Doctor Dickson, " of the production of yellow fever, accompanied, in twenty-two cases, with *black vomit*, and consequently *death*, on board the Circe frigate, principally from the duties of *clearing the hold* and *heaving down*; by which so many of the ship's company were soon after attacked with this fever, that a hundred and forty-six men were sent to the hospital at Antigua." p. 210.

The fifth chapter refers to the origin of the Spanish epidemics. In speaking of the Peninsula fever, we wish distinctly to state, that our conclusions are drawn from the analogy of the laws of the yellow fever of the West Indies, with which our acquaintance has been sufficiently extensive; and as the contagionists have themselves identified those diseases, we presume the propriety of reasoning by such analogy will not be disputed. By employing the term " marsh miasmata " to designate exhalations from the soil, to which Dr. Bancroft, in his former work, ascribed the origin of yellow fever, he has given his opponents an opportunity of apparently convicting him on his own evidence, by adducing the obvious inference, that where there is no marsh, the yellow fever could not have been caused by such miasmata. The topography of some places, where the epidemic

has prevailed, as Cadiz and Gibraltar, but where there are no ostensible marshes, has been accordingly exhibited with exultation, as a positive refutation of his doctrine. The error arises wholly from the inadequacy of the term employed to express the origin of such miasmata; and to shew that it is incorrect to ascribe to the author the opinion, that yellow fever is always the product of a distinct and ostensible marsh; we subjoin an explanatory quotation.

" In treating of the ardent or yellow fever, as it has occurred at Gibraltar, Cadiz, and other southern parts of Spain, I ascribed its production to the action of those vapours, or exhalations, which result from the decomposition of vegetable, or vegetable and animal matters, in a temperature of not less than 80° of Fahrenheit's thermometer, and which are commonly called marsh or paludal miasmata; an appellation which, in compliance with custom, I had occasionally adopted, though I well knew, and had repeatedly declared, that such exhalations or vapours are often emitted from soils and situations which had no resemblance to a *marsh*." —p. 253—254.

Again, in a note, at page 91 of his Essay, he says,

" I beg to state in this place, that, in joining the epithet *marsh* or *marshy*, to the terms miasmata, exhalations, effluvia, &c. and in considering these as a cause of fever, *I do not mean to intimate that such miasmata, &c. are emitted solely from marshes (it being certain that they frequently arise from soils in a different state);* but only to designate *the quality of those vapours*, which are eminently the product of *marshy* grounds."

This ought to have been a sufficient security against the misconstructions which his opinions on this point have suffered. With respect to the existence of paludal effluvia at Cadiz and Gibraltar, he adduces the prevalence, during the Summer and Autumn, of remittent fevers at those places, the acknowledged offspring of such exhalations, as indisputably demonstrating their presence and influence, however they may be produced, or from whatever source derived; and as farther proof of the universality of this cause of fever throughout the Peninsula, the statement of Sir James M'Grigor is not irrelevant, which shews, that 22,914 cases of ague were altogether admitted into the British military hospitals in that country.

In the investigation of the alleged proofs of the importation of the various epidemics into Spain, the author has displayed his usual ability and research; and we must observe, that his exposures of the frailties, inconsistencies, and anachronisms, with which those statements abound, refer equally to the proofs of Sir James Fellowes, and of Dr. Pym. Of the first epidemic of Cadiz in 1800, he naturally asks, if the disease is *sui generis*, and has not appeared for thirty-six years previous to 1800, from whence was it imported on that occasion?

" There must have been, somewhere on our globe, a spot on which

this disease had existed not long before the time of its supposed importation, and where it was found to possess a contagious power. That they have either proved this, or that there is, in fact, any such place on earth, I most confidently deny."

We cannot accompany him through his scrutiny of the pretended importations into Cadiz, in 1800, and into Malaga in 1803 and 1804; for these we must refer to the volume itself. The meteorological statements of Sir James Fellowes afford to our minds an adequate explanation of the aggravation and epidemical extension of the usual endemic at Cadiz in 1800; while the gradual progress of the disease, and the imperceptible conversion of the ordinary and milder, into the more rare and exalted form, constituting yellow fever, as manifested by the difficulties and dissensions which the Spanish physicians experienced in their attempts to fix the date, when the usual autumnal fever could be said to have ceased, and the epidemic yellow fever to have begun, confirm us in our opinion, that the question of Bulam, or continued yellow fever, is truly one of degree, and not of specific difference.

The author's former remarks on the defective signification of the term "marsh miasmata," to express the miasm of decomposition, are more especially applicable to the medical topography of Gibraltar, not unfrequently styled "*par excellence*" the Rock. The idea of the development of paludal effluvia from a surface ostensibly so dissimilar to a marsh, has not merely been denied; it has been assailed by ridicule. The rarity of agues in Gibraltar has also been adduced in proof of the non-generation of those exhalations at that place. This, however, as the author shews, betrays a very limited acquaintance with the modifications which are impressed on endemic fever by the influence of locality; and while remittents are acknowledged to be the usual form of the autumnal fever in Gibraltar (as well as in Cadiz), we need take very little pains to prove the existence and influence of febrile exhalations from the soil, however ingeniously the speculators on the locality of an elevated rock, and on the absence of agues, may argue to the contrary. The examination of the importation account of the epidemic into Gibraltar in 1804, is prefaced by this observation.

"At present, therefore, it will be sufficient for me to suggest as *obvious* and *prominent causes* of the epidemic in question, the accumulation of decomposable matters within the town, *and the long prevalence of a dry and scorching East wind,* which produced a very high atmospheric temperature, without any salutary ventilation of the place, as it was completely obstructed in its course by the high mountain behind the town, *in* and *over* which the air was for many weeks nearly stagnant. A similar dry and scorching East wind, blowing with too little force to change and purify the atmosphere, has invariably preceded and accompanied every recurrence of the yellow fever at Cadiz, and other cities of Spain. And its effects, in the year 1804, were very extensive and remarkable." p. 342—343.

We learn from the result of the enquiry into the alleged importation of that year, that Santos, the person who is accused of having imported the contagion into Gibraltar, from Cadiz, according to one account on the 28th of August, but according to another, on the 25th, left Cadiz several days *before* the time which Dr. Arejula, the chief official superintendant of all things belonging to the Andalusian epidemic, has declared to be the day on which the existence of the yellow fever was first discovered at Cadiz. He could not therefore have imported a disease from Cadiz which had no existence there. The importation by Santos, has been attempted to be corroborated by the evidence of a Mr. Pratt, who was also in Cadiz, and from whom Santos is alleged to have derived his contagion, while they resided in the same tavern. But the author says, that a very cursory view of his examination is sufficient to make any one "sensible of the obvious and irreconcileable contradictions which it contains, and of the absolute impossibility of its being true." The affidavit of this person states, that he was taken ill while living in a tavern at Cadiz, about the 18th or 20th of August; that eight days afterwards, he had symptoms of black or bloody vomiting; and then, fearful of being sent to an hospital, he removed to another part of the town, and ultimately recovered; and that *after* his recovery he applied for a passage to Gibraltar in the same vessel in which Santos returned to that place, but was refused on account of his very yellow look. The primâ facie improbability of a person who laboured under black vomit, being able to shift his quarters from the apprehension of any contingency, needs not to be insisted on; but the conclusion of the story is fatal to its credibility, and destroys all relation between the deponent's and Santos's illness; for the vessel in which Santos returned to Gibraltar, and in which Mr. Pratt says he was refused a passage *after* his recovery, left Cadiz, *at the latest,* on the 24th of August (as Santos and Sir James Fellowes assert, and public records prove), *several days before* the occurrence of the alleged *black vomit* in the course of Mr. Pratt's illness.

From such a tissue of contradictions, we know not what points can be selected as entitled to belief. The statements intended to establish the fact of importation, reciprocally destroy their respective foundations. We, therefore, recur with unshaken confidence to the domestic origin of the epidemics; and proceed to shew, that the bases of the subsequent attempts to fix the mode of importation are equally deficient in solidity.

A coincidence of local and atmospherical causes, similar to those which produced the epidemic of 1804, again aggravated the usual remittent of Gibraltar (which had regularly prevailed there in every intermediate year), towards the close of the Autumn of 1810, to the degree of concentrated yellow fever. The epidemic of that year has also been alleged to have been imported by some transports from Carthagena, crowded with French deserters. The substantiability of this allegation may be in some degree

appreciated by stating, that it rests wholly on the gratuitous assumption of a breach of quarantine. Some cases of fever had appeared among the soldiers in the transports, previous to their arrival at Gibraltar, of which one man had died. Sickness shortly ceased after their removal into hulks provided for their reception, and it does not appear that the fever was there communicated to any person: but the contagious nature of the disease was inferred from the subsequent attacks of the seamen, who remained in the transports, and of Mr. Arthur, who was sent on board them from the garrison to treat the sick. The cause of fever in those vessels, the author justly ascribes to the noxious emanations from their holds, which, in a former chapter, he has shewn to be capable of producing the worst yellow fevers. The attacks of Mr. Arthur and the seamen, are not proofs that the disease was contagious; the cause being local, every person exposed to its influence, might be expected to suffer, without the assumption of contagious agency. Dr. Bancroft refers to Dr. Burnett's previous statement in support of his rejection of the opinion of an imported contagion by these transports; but, it is necessary to repeat, that these vessels having been placed in strict quarantine immediately on their arrival at Gibraltar, the contagionists, in order to explain the origin of the epidemic by importation, are driven to the extremity of assuming a breach of quarantine. We would ask, if assumptions so perfectly gratuitous, be expected to be received as bonâ fide proofs of an affirmation, what fable, however preposterous, could be rejected on the score of want of evidence?

In the next epidemic, in 1813, Sir Joseph Gilpin was at the head of the medical department in Gibraltar. In a letter to Dr. Chisholm, published in the Edinburgh Medical and Surgical Journal, in speaking of the contagious nature of yellow fever, and of its importation in 1793 from Africa into Grenada, he states, "of the infected state of the Hankey, I never did, nor ever shall entertain the least doubt." This is certainly sufficiently declaratory of the tendency of his antecedent opinions. He says, that the first cases of the epidemic of 1813 occurred in two strangers, who imported it into Gibraltar on the 11th of August, in a vessel called the Fortune, from Cadiz, where he states (very erroneously, as will be shewn) the epidemic in question prevailed at the period of their departure. Now, Lieutenant-General Campbell, the Lieutenant-Governor of Gibraltar, writes to Sir James Duff, the British Consul at Cadiz, on the 13th of September, 1813, stating, that some cases of fever had lately occurred in the garrison, "but that there was not one of a contagious nature, as they were peculiar to the season only." Here we have the highest authority that no contagious disease prevailed in Gibraltar for more than a month after the arrival of the strangers from Cadiz; and the non-existence of the epidemic at Cadiz, not merely at the time of their departure from thence, but for a considerable time afterwards, is proved by the testimony of Sir James Fellowes, who, in speaking of Cadiz, states, at page 256, "in fact, until

the end of August, the people collectively were, according to all the reports at the time, in a healthy state: and, at page 261, he remarks, that it was only on the 14th September that he observed any case in the British hospitals that excited his suspicions. These statements prove (as in the instance of 1804), that no disease prevailed at Cadiz, at the time of the departure of the Fortune from that port; she could not, therefore, have imported a nonentity. Further, it has been seen, that more than a month elapsed after the arrival of the Fortune at Gibraltar, before the epidemic was observed in that garrison; on which point Dr. Bancroft observes,

"As Dr. Pym confidently asserts that the contagion of the Bulam produces disease *in four days*, at least in Gibraltar, its existence must have been made manifest by the occurrence of very many attacks within that interval; while, if it had been known to have produced *even one*, Sir Joseph Gilpin must have been highly culpable, had he not informed the Lieutenant-Governor thereof." p. 375—376.

It is not a little curious, that "the garrison of Gibraltar was in strict quarantine *for several months before* the malady made its appearance, and a Board of Health was sitting *almost daily* on account of the plague which had broken out at Malta."

This circumstance, added to the *assumed* breach of quarantine in 1810, inevitably involves the dilemma, of either acknowledging the futility of quarantine regulations for the prevention of the Bulam; or, otherwise, that the disease was not in either case imported. The advocates for quarantines are at liberty to choose their difficulty—the impossibility of supporting both positions is palpable.

The origin of the epidemic of 1814, the last which has occurred in Gibraltar, has not been attempted to be referred to importation, except by one individual, who advances no facts in support of his opinion. By the replies to the questions proposed by Deputy Inspector Frazer to the medical officers of the garrison, seventeen in number, we learn, that twelve declared it to be their belief, that the disease originated in domestic or local causes, unconnected with importation. Three were neutral; one declined offering an opinion; and one only derived it from importation. The original documents adduced in proof of the domestic origin of the epidemic of that year, are too numerous for us even to glance at. We, therefore, take our leave of the subject of yellow fever at Gibraltar, by repeating our perfect concurrence with the author, after a deliberate consideration of the question, that the fever which has prevailed there epidemically several times within the present century, originated from local or domestic causes, and was destitute of any contagious property.

The seventh and last chapter contains an inquiry into the causes of the epidemics of Cadiz, and other places in Spain in 1810, and in some subsequent years; but, as the disease was avowedly the same with that of former periods, it will not be incumbent on us to notice all the particular subjects,

which, in order to leave nothing relating to these epidemics without investigation, Dr. Bancroft has deemed it his duty to examine. With respect to the fever of Carthagena in 1810, which caused the deaths of three thousand persons in six or eight weeks, he observes,

" We are told by Sir W. Burnett (p. 274), that Dr. Riseuno, physician to the Spanish Royal Hospital there, ' positively asserts, that the fever was brought from Cadiz and Gibraltar, in 1810 ;' while Dr. Pym as positively asserted it to have been carried from Carthagena to Gibraltar. This last assertion has already been proved to be erroneous (see page 359, &c.) and the former must be so, because the ardent yellow fever, or Bulam, did not appear at Gibraltar (except in the transports) until near the middle of October, a month after the disease had been prevalent in Carthagena; and this observation is also applicable to Cadiz, which continued healthy till the middle of September, ' before which time many deaths had occurred at Carthagena ;' and these contradictory assertions serve only to manifest the readiness with which the contagionists, who believe that an epidemic yellow fever must always proceed from imported contagion, hazard tales to account for it." P. 415.

The history of an epidemic yellow fever, which prevailed in the 54th regiment at Stony Hill in Jamaica, has been brought forward by Dr. Pym, as a proof of the contagious origin of that disease. This opinion rests on the circumstance, that a detachment of the 54th regiment, which was sent from Stony Hill to Fort Augusta, and there quartered with a negro regiment and some European troops, became sickly; and that after their return to Stony Hill, fever passed through the whole regiment. It is not said from *whence* the contagion was derived; certainly not from the Negroes at Fort Augusta, who know nothing of yellow fever; nor yet from the European troops in those quarters; nor is it stated, that the other regiments in the same quarters with the detachment of the 54th, were not affected by the fever. " If therefore no contagion existed in Fort Augusta, none could have been carried to Stony Hill."

This statement had already been controverted by Mr. Doughty in his valuable publication on yellow fever.

" That the 54th regiment was attacked with the aggravated form of yellow fever, as described in these letters (published by Dr. Pym), I readily admit; and, that the other corps in the same quarters did not suffer, as stated by Mr. Rocket, I also most firmly believe. Now, as Mr. Redmond and Dr. Pym agree that the fever which prevailed in the 54th regiment was highly contagious, and Mr. Rocket asserts the other corps remained unaffected with it, I ask from what source did the 54th imbibe its contagion? The fever developed itself at the season when the endemic cause prevailed, and which might that year be more powerful, and exert its influence to a wider extent, than it had done the preceding years. The soldiers of the 54th were susceptible of its influence,

whist those of the other corps were not in the same degree; because one of those latter regiments had been in the island, to my knowledge, not less than *three*, and the other *six* years, and a great part of the time, in quarters, annually visited with yellow fever."—*Observations on Yellow Fever*, p. 54.

There remains the history of another epidemic yellow fever, recorded by Dr. Pym, as owing its origin to contagion, which we are somewhat surprised to find that Dr. Bancroft has omitted to notice; more especially as his local knowledge of the scene of the transaction (with which we also have some acquaintance), would, we apprehend, have rendered the task of its refutation void of difficulty. We allude to the fever of the 70th regiment in Fort Edward, Martinique, in 1794; and refer to Dr. Fergusson's excellent topographical remarks on Fort Royal (*Med. Chir. Trans.* Vol. iii., p. 119 to 122); and also to Mr. Mortimer's introductory letter to his valuable Report on Yellow Fever, published in the Medico-Chirurgical Journal, in proof, that the sickness, of that regiment, attributed by Dr. Pym to contagion (*Obs. on the Bulam Fever*, p. 10—14), depended wholly upon local and indigenous causes.

We conclude this subject with the author's exhortation respecting the preconceived opinions of contagion, which strangers usually carry with them into tropical climates; but which, in by far the majority of instances, ultimately yield to a more intimate acquaintance with the habitudes of the disease in question.

"I earnestly request my readers attentively to reflect upon the facts stated in this chapter; and especially upon the readiness with which numerous medical men, respectable by their characters, their conduct, and their professional ranks, have come forward to make confessions which are generally felt as in some degree humiliating, by acknowledging, that they had, when they first arrived in the regions of yellow fever, entertained opinions, deeply fixed in their minds by the ordinary course of medical education, which, however, after more extensive observation and better means of information, they had found reason to abandon as erroneous, and been forced to adopt conclusions directly the reverse, in regard to the alleged contagious nature of the yellow fever. This is stated to have been done by Dr. M'Lean, Dr. Fergusson, and all their colleagues on the hospital staff at St. Domingo; it was done also by myself, and almost all on the hospital staff in the Windward Islands (see the letter of Mr. Young, Inspector-General, on this subject, at page 335 of my Essay); it was done by Dr. Dickson, and, as he declares, generally, by others in the circle of his aquaintance; and, beside many others, it will soon appear to have been done by Dr. Erly at Sierra Leone, on the very coast where Dr. Pym and Dr. Chisholm pretend to derive their Bulam fever. In all these cases, the change of opinion has been made spontaneously and disinterestedly, by the silent and gradual, but certain operation of truth; and without any

desire to gain credit by a supposed preservation of many lives from a danger which had no existence, and without any of those views to promotion and reward, which may have produced some of the exertions and erroneous statements lately made, in regard to the fever under consideration." —p. 189—190.

On the subject of typhus within the tropics, we think Dr. Bancroft has somewhat, and with advantage, modified his former opinions; for his admission, p. 174, seems to sanction a greater latitude of inference, than could be deduced from his former volume, respecting its being carried as far as Barbadoes. We also are of opinion, that typhus may, and does exist occasionally within the tropics; and we have seen what we consider to be unequivocal cases of that disease on the Atlantic Equator; but we coincide with the author, that the climate is extremely unfavourable to the existence and perpetuation of typhus contagion, and that it ultimately exhausts itself.

Upon the occasional occurrence of a hybrid disease, which Dr. Bancroft simply alludes to as having noticed in his Essay "without either approbation or disapprobation," we do not profess to offer any decided opinion.* It is known, that Sir John Pringle, Sir Gilbert Blane, Dr. Lempriere, and others, have spoken of a mixed or hybrid fever; and we have understood, that Dr. Dickson is of opinion, that he has seen some instances which favour the existence of such character of disease; where the appearance and duration of the symptoms were so intermediate between typhus and yellow fever, that it was difficult to say, to which order of fever they most belonged. But we believe, at the same time, that he considers such occurrences as extremely rare; that he has not detected any satisfactory evidence of their possessing an infectious quality; and that, under the influence of climate, they soon disappear, and are succeeded by the legitimate endemic of the West Indies. Such questions can only, we conceive, be ultimately decided by those who may enjoy similarly extensive opportunities of witnessing the disease under all varieties of circumstances and character.

We conclude by expressing our sense of the ingenuity, acuteness, and research, which the author has exerted with equal facility and effect in the present elaborate production; and we are satisfied, that the voluminous mass of irrefragable evidence which he has been enabled to adduce, will impress conviction on every unprejudiced mind, of the perfect triumph he has achieved by the complete refutation of the opposite opinion, of the existence of the Bulam as a distinct contagious fever, attacking but once. In the preceding analysis, we have aimed at the inclusion of the most pro-

* The reader will bear in mind that these are the sentiments of the *reviewer* of Dr. Bancroft's work, as they are somewhat different from those of Dr. Johnson, as broached in various parts of this Essay.

minent parts of the discussion; for its length we plead the importance of the inquiry, and the desire to diffuse a portion, at least, of the information with which the pages of this "Sequel" are enriched, as well as to contribute our mite to the advancement of what we consider to be the cause of truth, and to the correction of a popular error; for as the author justly observes in his conclusions, the supposition of the existence of contagion "accords with the prejudices and apprehensions of the greater part of mankind, who are prone to believe that all diseases are contagious when they become generally prevalent." To those whose lot and duty it has been to alleviate the sufferings inflicted by yellow fever, and who, therefore, with us, naturally feel a peculiar interest in the discussion, we need not say more to induce them to avail themselves of the information and experience accumulated in this volume.

Topographical Remarks, illustrating the Causes and Prevention of the Tropical Endemic or Yellow Fever, by Dr. (now Sir David) Dickson, F.R.S. Ed. F.L.S. Fellow of the Royal College of Physicians of Edinburgh, late Physician to the Fleet, and Inspector of Hospitals in the West Indies, and now Physician to the Royal Naval Hospital at Plymouth.

——Quod sol atque imbres dederant, quod terra creârat
Sponte sua. Lucret. Lib. v.

As the knowledge of a disease is of interest in proportion to its danger, or frequency, and as the means of prevention depend upon a correct appreciation of its causes, the investigation of the laws which govern the tropical endemic is confessedly of the highest importance.—With this view I offered some topographical remarks on the etiology and prevention of the yellow fever, in the 13th Vol. of the Edinburgh Medical and Surgical Journal; and, on the present occasion, I have endeavoured, by the addition of several observations and illustrations, still further to elucidate the subject.

Marsh miasma has been very generally, and justly considered as a grand source of the fevers of warm climates; and it is a very frequent, though not the only source of the destructive form of the tropical endemic. While its operation has been too exclusively insisted upon by some authors, it has been admitted under great limitations only by others. The term, indeed, is not free from objection, since it has caused the latter to receive it in a sense far too strict and literal, and to question the existence of such exhalations, except in the vicinity of a complete swamp or marsh.

I am at present to consider the miasmata of decomposition, with reference to their effect, and not to their intimate nature, in whatever situation they may occur; and, in this general sense, it appears to me, that, in a temperature so uniformly high as that of the West Indies, and where de-

composition is so rapidly promoted by the agency of heat and moisture, there can be very few places where the occasional production of noxious effluvia may not be calculated upon on shore; and sometimes, also, on ship-board. Of fever arising in particular ships, from impure exhalations emanating from a foul state of the hold, continuing notwithstanding every attention to preventative measures, and ceasing only upon the hold being cleared, I have seen many well-marked instances. As the most unseasoned part of a ship's company, and especially strangers, will be most liable to suffer in this case, it is easy to perceive that such attacks might sometimes be construed in favour of infectious fever; but that they proceeded solely from the source above-mentioned, appears to me clearly demonstrated by the previous inefficacy of ventilation and cleanliness—by the impunity with which promiscuous intercourse, elsewhere, is maintained with other ships,—by the extinction of the disease upon the hold being cleared, and not till then,—and by its not being propagated or communicated by the sick, when removed from its original source. I shall adduce one example, where, from the peculiar construction of the vessel, the source of the febrific exhalations could be more clearly ascertained than when they arise from a foul state of the ballast in general. In April, 1807, a fever prevailed in the Dart, lying guard-ship at Barbadoes, which, at first, was attributed to land influence, and irregularities committed by the men employed on shore; but as it continued from time to time, to attack new comers especially, after sleeping two or three nights on board, an internal cause became suspected. The ship was divided into compartments below, so as to allow of the water being carried in large tanks or cisterns, instead of the usual manner; and these, having been disused in harbour, their bottoms were found to be covered with an offensive deposition of slimy mud. On the 17th of May, cases of fever still supervening, I find by my notes that this evil had been detected, and remedied; and communications between the divisions had been opened, so as to allow a free circulation of air below; and on the 24th I find it stated, "for the last week no fresh attacks of fever have occurred on board the Dart." The fatal cases terminated at the hospital with the usual symptoms of yellow fever. As such fevers may occur at various periods after exposure, consequently, after the cause has been removed, the early cessation of the disease, in the present instance, is more material, where the ship was constantly receiving new men; because their not being affected subsequently, shewed that the cause which had existed previously, existed no longer.

Impure effluvia will be most apt to be generated in a new ship, particularly if built of green wood; or where the shingle ballast has not been restowed for a length of time, or had not been, originally, carefully selected. If such exhalations (between which and animal effluvia, confined or produced by the human body under disease, a wide distinction obtains, though their effects have been often confounded), be admitted to occur,

occasionally in a man-of-war, where cleanliness is proverbial, it is easy to perceive that, by the agency of heat and moisture, they may, under particular circumstances, in a transport or merchant ship, become so abundant and concentrated, that the hold, without the expression being very figurative, might be denominated a ship marsh.*

But a grand source of obscurity and of contradictory opinions appears to me to originate from a want of attention to those different states of the system, involving a great diversity of liability to the yellow fever, from the lowest grade of European susceptibility to the highest degree of disposition to the disease, short of actual fever. Consistently with this diversity, it follows that a quantum of cause altogether innoxious and insignificant in the former, would be fully competent to induce the disease in the latter state of the system; hence, it is easy to understand, that according to the gradations in the scale of susceptibility will be the power of the noxious impression; and moreover that, what in one subject would constitute a predisponent, in another, possessing a higher degree of disposition, would prove an exciting cause of the yellow fever. I have here used the word disposition instead of predisposition (though I should have preferred the more familiar term), because it might be contended that the latter ought to imply an original, or, at least, a previous rather than an acquired tendency.

The degree of such disposition may fluctuate considerably during the earlier period of an European's residence in the West Indies, according to his age, habits, locality, the season of the year, and as various stimuli have a greater or less influence upon the system; or, in other words, in proportion as it has been freely and suddenly, or cautiously and gradually exposed to their operation. In such a climate, where the youthful, sanguine temperament is, at any rate, goaded by the stimulus of unnatural heat, into a degree of febricular excitement, it is not extraordinary that, from free living, intemperance, or undue exposure or exertion, there should be much danger of this artificial excitation terminating in real fever, until the system becomes gradually inured, and less sensible of such influence by the effect of habit, or assimilated by the supervention of what have been called, seasoning, or milder attacks of sickness.

The dangerous increase of susceptibility may be often observed in ships recently arrived from Europe, continually healthy, while refitting in harbour, for ten days, a fortnight, or longer, according to the season, and be-

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* A very apposite and striking illustration of this remark has subsequently appeared in the account of the sickness in the Regalia transport, by Drs. Fergusson and Mortimer. —*Vide* Medico-Chirurgical Transactions, vol. viii. p. 108; and Bancroft's "Sequel," p. 217, et seq. In the latter able Work, several other instances of fever, arising from an impure state of the hold, are extracted from my official Report to the Naval Medical Board, and other sources.

coming very sickly afterwards. Its variation, and decline, are sufficiently exemplified in the disparity of health enjoyed by the crews of ships under repair, at the same time, and in the same harbour, and exposed to precisely similar exciting causes, but differing in the length of their residence in a tropical climate, or the degree of exposure or sickness to which they had been previously subjected. The variation in these respects will cause such dissimilar results, that a fatal fever will become general, in a short time, in one ship; in another, the sickness will be partial, and less dangerous; while a third will be altogether exempt, or experience only mild and occasional attacks. This gradation will be sufficiently obvious, although its uniformity may be somewhat affected by peculiarities in season, modes of discipline, and various minuter causes, while the chief circumstances are apparently the same.

The danger of a West India climate, or in other words, the tendency to yellow fever, I conceive, then, to be in the compound ratio of the disposition, and the force of the exciting cause; a weaker exciting cause being sufficient when the system is strongly disposed, and *vice versâ;* for, fortunately these often obtain in an inverse proportion; and the constitution has been more or less habituated, previously to any considerable exposure. How greatly the preservation of health must depend upon the inurement being gradual, is too obvious to require any comment. The degree of security, however, that may be acquired, will be relative; for the susceptibility will be less after an attack of this fever,—or from being habituated to miasmata, or other remote causes, than from mere length of residence.

Marshy effluvia, or similar impure emanations in other situations, I have already stated to be, in my opinion, a great source of yellow fever, either as a predisposing or exciting cause: but, if the above premises be correct, it farther follows, that the causes of yellow fever may be the same as the remote causes of fever in general; that they may act in various degrees of intensity, or combination; that the weaker require the aid of disposition, to become efficient; but when the system is highly excited or prepared to fall into fever, that any additional agency, though of itself inoperative and insignificant, may become the occasional cause; and, consequently, that this disease may be called into action, in some cases, by such as are feeble, dissimilar, and so obscure as to elude investigation.

In speaking of causation, then, I do not mean to express individual agency, but any concurrence of circumstances which constitutes a cause; for I imagine we can seldom, in pathological physics at least, calculate upon either singleness of cause, or simplicity of effect. If the preceding principles are well founded, it will not be necessary here to enter into any length of illustration to show, that sporadic cases may arise, in this way, at all seasons of the year, from insolation, or undue exposure, intemperance, fatigue, or other irregularities, as well as from circumstances so

minute, as often to escape detection; that a number of men, such as a regiment, or a ship's company, or any part of them, from similarity of temperament, employment, or situation, will often suffer simultaneously, particularly during the hurricane season, and all the latter half of the year; and that, in particular years, from previous unseasonable weather, or an epidemic constitution of the atmosphere, and in all years, during the sickly months, when a considerable number of unassimilated men have been recently introduced into the West Indies, the yellow fever may be expected to become general among them, and to be attended with great mortality, particularly after much exposure and exertion, often inseparable from active warfare. As the constitution will suffer less excitement from the heat, the coming from another part of the torrid zone, or a southern climate, will confer a certain degree of protection, but this will be only sufficient to guard against the weaker, or ordinary causes of yellow fever. The gradation which I have above attempted to explain, is well illustrated by the following unstudied, but impressive extract of a letter, from Mr. Sheppard, now lying before me;—"While we were all ill, and dying in the Alligator, in English Harbour, shortly after our arrival in the West Indies, the Emerald, which had been two or three years in the climate, remained near us healthy, though under precisely the same circumstances of duty and exposure. The Emerald was succeeded in her situation by the Carysfort, fresh from Europe, which ship, in a few weeks, buried almost all hands."

From regarding the habits as well as the etiology of the tropical endemic, the laws which govern its appearance seem to me to be entirely different from those of the plague and typhus fever, with which it has been sometimes compared. To those disorders, strangers, and the natives of the countries in which they prevail, are *cæteris paribus*, obnoxious in the same degree; and all such as are equally exposed, may be said to be equally endangered. But it is totally different in the legitimate yellow fever, in the West Indies. It is the disease of manhood, of the excited, unassimilated, full habit. It more rarely attacks an earlier or a later period of life; and seldom females, or only in proportion, as from intemperance or other causes, they approach to the habit of the male sex; while old residents, whether native or assimilated, and people of colour, though subject to remittent and other milder forms, may be said to be almost entirely exempted from this severe form of disease,—for they are so, with as rare exceptions as we witness in the application of any other general rule.

But whatever may be the peculiar coincidence of circumstances, or modification of cause, most fertile in the generation of yellow fever, an uniformly high temperature is the *causa sine qua non*. This is literally and eminently entitled to be so denominated, because it indispensably precedes the effect. In the Caribean Archipelago, the temperature is not only high, but equably

and durably so; and, from its little variation in this respect, I consider the yellow fever as the legitimate product of the climate; for, in the more southern colonies on the Continent, where, from the vicinity of woods, mountains, &c. the temperature, though often as high, is not uniformly so, and where the winds are more variable and the nights cooler, the disease is much less prevalent, and oftener assumes a remittent type.

To the importance which I attach to an equably high atmospheric temperature, it may be objected by some persons, that, in countries which should be still more favourable to this disease, because the heat is more intense, and also in places lying in the same latitude, the yellow fever is not known. But, in the first place, it becomes incumbent on such persons to shew, why a temperature above a certain height ought to be more favourable; for, on the contrary, I should expect that great heat would dissipate and destroy, if not prevent, the formation of the miasmata of decomposition; and, secondly, it by no means follows that the climate of two places is alike, because they lie at the same distance from the equator.

M. Humboldt remarks, that the salubrity of tropical climates depends more on the dryness of the air, than on any of its other sensible qualities: "The burning province of Cumana, the coast of Cora, and the plains of Caraccas, prove that excessive heat, alone, is not unfavourable to human life."

All historians concur in admitting the different laws to which the corresponding degrees of the two hemispheres are subject, with respect to the distribution of heat and cold; for the exceptions, from local causes, stated by Calvigero, cannot affect the general principles. The difference in the same latitude has been estimated at 12, or more degrees; but according to relative situation, it must be often much greater.

The dissimilarity of climate, between the eastern and western sides of the New Continent, from this cause, and from the greater variableness of the wind, is also noticed by various writers, and particularly in the voyages of Ulloa, Anson, and others.

At Lima, which is but a little farther on one side of the equator than Carthagena is on the other, the heat is far more moderate; and the observations made by the academicians at Quito shew, that, from its elevated situation, although close to the line, the thermometer does not rise there, so high in Summer as it does in Paris; nor does it fall so low as in the temperate climates of Europe in Winter, so uniform are the seasons.—*See Rees, Pinkerton, Walton, &c.*

This disparity of the Old and New Continent, and of places lying in the same parallel, is sufficiently accounted for upon philosophical principles, and depends on the elevation, depression, extent, or configuration of country, direction of the winds, nature and cultivation of the soil, proximity and height of mountains, vicinity of the sea, and many circumstances which modify the temperature of a climate, besides its distance from the equator,

and the consequent more vertical, or more oblique incidence of the solar rays.

Dr. Robertson observes, "while the negro on the coast of Africa is scorched with unremitting heat, the inhabitant of Peru breathes an air equally mild and temperate, and is perpetually shaded under a canopy of grey clouds, which intercepts the fierce beams of the sun, without obstructing his friendly influence. Along the eastern coast of America, the climate, though more similar to that of the torrid zone, in other parts of the earth, is nevertheless considerably milder, than in these countries of Asia and Africa, which lie in the same latitude."

He afterwards shews that the trade wind is still farther cooled in its passage from the Atlantic to the Pacific shore of the New Continent. "As this wind advances across America, it meets with immense plains covered with impenetrable forests, or occupied by large rivers, marshes, and stagnating waters, where it can recover no considerable degree of heat; at length it arrives at the Andes, which run from North to South through the whole Continent. In passing over their elevated and frozen summits, it is so thoroughly cooled, that the greater part of the countries beyond them hardly feel the ardour to which they seem exposed by their situation. In the other provinces of America, from Tierra Firmè, westward to the Mexican empire, the heat of the climate is tempered in some places by the elevation of the land above the sea, in others by the extraordinary humidity, and also by the enormous mountains scattered over this tract."—*History of America, vol.* II. *p.* 9, *et seq.*, *9th edition.* Hence the great salubrity of the table-land, in the centre of New Spain, compared with the low marshy lands upon the coast.

On the opposite sides of Mexico, where the distance is so much less than across the other parts of the Continent, the influence upon disease is yet considerable. Thus we learn that, although bilious fevers and cholera morbus prevail, the black vomit has never yet been observed on the West Coast of New Spain, while Vera Cruz is considered as the chief seat of that terrible distemper.

The disastrous results of the expeditions to Carthagena, Porto Bello, Vera Cruz, &c. which have been the theme of the historian, and of the poet, have, indeed, fatally proved the peculiar noxiousness of the extremely hot, alluvial, and marshy soil of the eastern shore.

Even in the short distance of 60 miles, between Panama and Porto Bello, the difference is sufficiently perceptible, although, from improvements, it may be less so of late years. Ulloa remarks, that the garrison detachments sent from the former to the latter, "though coming from a place so near, are affected to such a degree, that, in less than a month, they are so attenuated, as to be unable to do any duty, till custom again restores them to their strength;" and that "the inhabitants of Panama are not so

meagre and pale as those who live at Carthagena, and Porto Bello."—*Translation by Adams, vol.* i. *p.* 98 *&* 123, *4th edit.*

I am the more anxious to advert to these points, because they assist in explaining the influence of locality and susceptibility in the production of yellow fever.

For, besides the lower and more variable temperature and winds on the extensive coast washed by the Pacific Ocean, the introduction of Europeans is more gradual and limited, and their constitutions may be supposed to have lost that freshness (if I may use the expression) so favourable to this disease, by the length of the voyage and climates through which they must pass; or by the seasoning attacks, to which they are liable before they reach their destination, if they land at an eastern port.

There are two powerful reasons, then, why Europeans, on the other side, are so much less subject to yellow fever: They have not only lost a considerable share of their original susceptibility by pre-assimilation, but their equatorial parallelism is so far counterated by the difference of climate, that they may be considered, though *actually* living in the same, as *virtually* living in a more northern latitude.

The converse of this proposition appears to me well adapted to explain the occasional appearance of the fever which has excited so much controversy in America and in the South of Europe. *During the unusual and long-continued height of the thermometer, by which these epidemics have been preceded, the inhabitants are virtually placed in a new or tropical climate; and the same general effect follows which would result from the sudden transition of a body of men to the West Indies, with a considerable share of northern susceptibility. In both cases, the constitution, being unassimilated to the change, will be liable to be affected by the unusually heated and peculiar state of the atmosphere, whether its influence may be admitted to consist in producing the dispositional tendency of which I have spoken, or the development of those miasmal products most favorable to this form of fever, or in both.*

Hence the natives of the torrid, and of the temperate zone, are upon a very different footing in respect to susceptibility. For, while the former may be considered as exempt from yellow fever, the inhabitants of the United States and of Spain (though probably somewhat less liable than more northern strangers) cannot be seasoned against it by any length of residence in their native country. For, from the variations of temperature to which they are exposed, they may be expected to lose, during the Winter, any degree of assimilation they may have acquired during the almost tropical heat of the preceding Summer; and (like the natives of the Antilles, after residing a certain time in Europe) they become liable to be attacked by the yellow fever, when the thermometer has maintained, for a certain period, the degree of heat necessary to produce the requisite disposition, or the evolution of sufficiently concentrated miasmata.

As illustrating the grounds upon which the occasional appearance of the yellow fever may be anticipated in ultra-tropical situations, and at the same time pointing out some of the sources, by the remedying of which the chance of its occurrence may be diminished, I shall here introduce the remarks of M. Devèze, on the locality of Philadelphia, quoted from the second volume of the Quarterly Journal of Foreign Medicine and Surgery, p. 434—5. " M. Devèze enters upon the first chapter with a topographical description of Philadelphia; and from its situation upon a plain on the banks of the Delaware, intersected by large ditches, from which the Winter's rain can only escape by evaporation, carrying along with it the detritus of the clay soil, and the vapours and gases arising from the decomposition of the vegetable and animal substances which cover their banks; from the sudden transitions of temperature and humidity of the atmosphere, not only in regard to its annual or monthly variations, but in respect to what usually takes place within the twenty-four hours; concludes, that Philadelphia, from these combined causes, must frequently not only be the seat of sporadic cases of fever, but also of the more destructive epidemic forms of this disease. That the character of the fever which appears in the southern parts of the United States, should put on the same form with the fevers of tropical climates, is indeed, almost to be expected, from the excessively rich, deep, and absorbent nature of the soil; combined with the other adventitious circumstances of stagnant pools and ditches, filth of various descriptions, gases arising from decomposed organized remains, floating in an atmosphere, whose temperature, during the Summer months, almost exceeds that within the tropics, and which, according to M. Devèze, was found by the French emigrants at Philadelphia more debilitating than what they experienced at St. Domingo."—*Traité de la Fièvre Jaune; par M. Devèze*, 1820. See also the graphical remarks of Dr. Robertson; and those of Dr. Girardin on the topography of Louisiana.

M. Devèze, moreover, found that the quantity of electric fluid existing in the atmosphere was there extremely variable; and that the number of insects was unusually great, during the hot months, when the epidemic raged in that city,—a strong indication of insalubrity. It may be proper in this place to remark that, in such climates, results drawn from the greatest and smallest elevations of the thermometer at certain periods, give no information respecting the mean temperature; for, from inattention to this point, in discussing the question, whether the heats might be considered as extraordinary in epidemical seasons, it has been affirmed that the heat was greater in some healthy, than in unhealthy years, because the thermometer rose a few degrees higher in the former than in the latter.

Upon ultra-tropical yellow fever I do not propose to offer any observations at present; but I am inclined to believe, that the discrepancy of

opinion is much to be attributed to partial and incomplete views of disease in limited and detached situations; and that the more we see of fevers in the various quarters of the world, the more we shall be induced to refer to general but determinate principles their phenomena, as well as their mode of action or effects upon the body, though the latter, of course, will be susceptible of great diversity, according to the nature or concentration of cause, individuality of constitution and structure, and relative importance of the organs particularly affected.

In his celebrated work on the political state of New Spain, to which I have already alluded, M. de Humboldt seems to have justly appreciated the influence of uniformity of temperature, situation, and individual susceptibility, in the production of yellow fever. I shall quote from my notes, as I have not the book before me. He is of opinion that the yellow fever has occurred sporadically whenever persons born in a cold climate have been exposed, in the torrid zone, to air loaded with miasmata; and he very properly cautions us against confounding the period when a disease was first described, with the date of its first appearance.

The yellow fever, he informs us, is still unknown at Acapulco, though, from the uniformity of the heat, he is apprehensive that, if ever developed, it will continue the whole year, as in other situations where the temperature varies only two or three degrees during the year; and he most judiciously remarks, that, if this port, instead of being frequented by ships from Manilla, Guayaquil, and other places of the Torrid Zone, received ships from Chili, or the north-west coast of America, if it were visited at the same time by a great number of Europeans, or of Highland Mexicans, the bilious would probably soon degenerate into the yellow fever, and the germ of this last disease would develop itself in a still more fatal manner than at Vera Cruz. M. Humboldt afterwards gives a still more satisfactory reason why it is not brought from Chili, viz. that it does not exist there;—which I imagine to be not a little applicable to the Bulama, and some other instances of imputed importation, like that from Siam, characterized by Dr. Lind as "truly chimerical." For, after stating that the yellow fever has not appeared upon the coast of the Pacific Ocean during the last fifty years, except at Panama, and that there, as at Callao, the commencement of a great epidemic is often marked by the arrival of some ships from Chili, he adds, not that they imported the disease from a country where it never existed, but because the inhabitants, coming from the healthiest country in the world, experienced the same fatal effects of a sultry air, vitiated with putrid emanations, as the inhabitants of the North. See the 4th volume, by Black, and the 29th Number of the Edinburgh Medical and Surgical Journal.

The same reasoning, I may observe, particularly applies to the error which has been so often committed, of mistaking epidemic for contagious diseases, and supposing them to be imported by new comers, because, from

unassimilation to the new atmosphere, they are generally the first and greatest sufferers from local causes. Thus, Ulloa states, though he does not seem to believe it, that, when the black vomit first appeared at Guayaquil, in 1740, the galleons of the South Sea, having touched there, it was the general opinion that they had brought that distemper, and that great numbers died on board the ships, together with many foreigners, but very few of the natives.—*Adams, vol.* i. *p.* 161. I need hardly remark how infinitely more probable it is, that the sailors, coming from a pure air, suffered from the unhealthy marsh in the vicinity, which Estalla describes as infecting the city, at particular seasons, with pestilential vapours; but which, to the natives, from habituation, was comparatively innoxious. Even in ordinary seasons, in the West Indies, it is not unfrequently observed, that men, though partially seasoned in one place, are, nevertheless, liable to be again attacked by fever upon their removal to another, or even to a different part of the same island; and this sometimes happens, although the latter may be esteemed as healthy, or even a healthier situation; proving the influence of a new, or in some respect differently modified atmosphere, or of other circumstances which the apparent locality, though it may in some degree, is insufficient wholly to explain.

It is, therefore, probable, that in different places and seasons, there is not only a difference in the power or intensity, but in the nature and combination of febrific miasmata, upon which the increased liability to sickness on a change of residence, may, in a great measure, depend.

Indeed we not only observe striking peculiarities in the features of disease, in different climates, but often a considerable change in the state of health from a seemingly inconsiderable change of situation; and if such effects happen from modifications of climate, soil, or other circumstances, for which we are so often unable to account, it is necessarily much more to be expected that strangers, arriving at the commencement of a sickly or epidemic season, should be the earliest victims; and thus, erroneously, they have been sometimes thought to have brought a disease, merely because they were the first affected by new miasmata, or other local causes, increasing the susceptibility of a habit probably already prone to febrile or inflammatory action.

As for the reasons already given, and from personal observation of the tropical endemic in almost every variety of situation—proving it to arise in hot, low, moist, close places, when new men are exposed to miasmata, intemperance, insolation, or fatigue—I must consider the yellow fever, not as an imported or contagious disease, but as a strictly local and indigenous evil, "quod sol atque imbres dederant, quod terra creârat sponte sua," to use the words of Lucretius in a different application. I shall only remark here, that if it possessed any contagious property, it is to me altogether unaccountable, that conviction thereof should not have been coerced, almost with the force of mathematical demonstration, long before the pre-

sent day, considering the continual and unrestricted intercourse generally carried on between ships, as well as between the opposite sides of the Isthmus of Darien. But, on the contrary, examples of individual disease, or of a limited number only, are constantly occurring in the same ship, again and again, without extending farther; and it becomes epidemic, as I have endeavoured to explain, only when a generally operating cause produces a general effect. Hence it is legitimately endemic in the West Indies, and becomes often epidemic there at particular seasons, and occasionally in other countries, after exposure to the influence of tropical heat. If the fever of Gibraltar and other parts of Spain be the same disease, and if it possess any such property, which I consider as still remaining to be proved, I must, therefore, contend that it is not a native, but an adventitious character, and that, like other diseases attended with febrile action, in temperate climates especially, it is susceptible of being modified by the occasional coincidence of peculiar circumstances, such modification placing it in a class which, in my official report on the subject to the Naval Medical Board (perhaps inaccurately, but for the sake of distinction merely), I called *diffusible disorders*, the power of dissemination in such not being, as in other communicable diseases, native and inherent, but contingent and acquired.* Although I do not mean here to enter farther upon the question of the Peninsula fever, yet, as its progress has been considered by some to be satisfactorily traced, and its prevalence to be unaccounted for by any supposition of an epidemic change of the air, or endemic origin,

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* Although decidedly of opinion that the yellow fever of the West Indies is not a contagious disorder, and that the climate is highly inimical to the very existence of contagion, Dr. Dickson does not mean to deny the abstract *possibility* of *any* fever becoming so, under particular circumstances, at least in temperate climates; but he contends, that a distinction ought to be made between an inherent and an adventitious property. In a former communication to the author he observes, that he uses the term diffusible disorders to express, not a native and permanent, but an acquired and temporary power of dissemination; and he proposes indicating the degree of such power by a change of termination. Thus using the same epithet (for the propriety of which he does not contend, but only for the sake of illustration) a diffus*ive* disease might signify that which can or may diffuse itself; and a diffus*ible* one, that which can or may *be* diffused; the latter requiring for this purpose the co-operation of a peculiar, but transitive coincidence of circumstances. For such purposes, he remarks, we have the potential *active*, and potential *passive* adjectives, as they are called by Horne Tooke. Belonging to the *former* we have the termination *ive*, borrowed from the Latin, and *ic* from the Greek :—belonging to the *latter*, we have (from the Latin *bilis*) the terminations *able* and *ible*; and also the contraction *ile*, having one common signification.—Scaliger distinctly points out the force of the two terminations *ilis* and *ivus*, "duas habuere apud Latinos, totidem apud Græcos, terminationes—in *ivus* activam in *ilis* passivam, &c." Dr. Dickson further suggests, whether, in speaking of absolutely contagious or infectious diseases, we might not, by the noun substantive or adjective, indicate a *greater* or *less* degree of such power; as in the *latter* by the termination *osus* and *ivus*, &c. ex infectio*sus* and infectiv*us*? "Hæc omnia infectiva appellantur."—Vitr.

without a reference to contagion, I may be permitted to remark, in passing, without dwelling upon the inference, that, in the latest work upon the subject, and in which this opinion is temperately supported, the concurrence of a certain height of temperature, and of a combination of circumstances difficult to define but connected with the climate and individual predisposition,—is nevertheless admitted to be necessary to the existence of the disorder.

Indeed, stronger evidence of a highly deleterious state of the atmosphere, as exemplified by its pernicious influence upon animal life, in these instances at least, cannot well be adduced, than that furnished by the author of the reports himself; for, in the fever at Cadiz in 1800, Sir James Fellowes, I believe in page 45, speaking of the air, says, " its noxious qualities affected even animals; canary birds died with blood issuing from their bills;" and he quotes the authority of Arejula in further proof of similar fatal effects upon domestic animals, particularly dogs, cats, horses, poultry, and birds.

In equinoctial regions the effect of elevation (as indeed was conjectured by some of the ancients) is equivalent to that of latitude. We are informed, that the farm of *L'Encero*, beyond Vera Cruz, which is 3043 feet above the level of the ocean, is the superior limit of the *Vomito;* and that the Mexican Oaks descend no farther than this place, being unable to vegetate in a heat sufficient to develop the germ of the yellow fever. The situation of Vera Cruz, indeed, is peculiarly adapted to establish the nature and indigenous origin of this disease. The traveller, by the ascent of a few hours, is carried beyond its reach, from the rapidity with which the ground rises to the westward, for it is not felt beyond ten leagues from the coast; while, conversely, the Creoles, who inhabit the elevated table-land of New Spain, where the mean temperature is about 60°, and where the thermometer sometimes falls below the freezing point, when they descend the eastern declivity of the Cordillera, are plunged as it were at once " unanointed, unannealed" into the extremely hot, and deleterious atmosphere of Vera Cruz, and suffer even in a greater proportion than European strangers, who approach it gradually by sea. In fact, these Mexican mountaineers, in descending from Perote to the coast, in sixteen hours are transported from the temperate to the torrid zone, and by this sudden change are exposed to all the dangers of a new and fatal endemical disease. This concentrated variety of climate, and its influence on the vegetable, as well as the animal creation, is depicted with such force and beauty by Baron Humboldt, that I cannot resist laying before the reader a description which, in a few lines, carries him from the burning plains in the vicinity of the sea, to the regions of perpetual snow. " The admirable order with which different tribes of vegetables rise above one another by strata, as it were, is no where more perceptible than in ascending from the port of Vera Cruz to the table-land of Perote. We see there the physiognomy of the country, the aspect of the sky, the form of plants, the figures of animals,

the manners of the inhabitants, and the kind of cultivation followed by them, assume a different appearance at every step of our progress.

" As we ascend, nature appears gradually less animated, the beauty of the vegetable forms diminishes, the shoots become less succulent, and the flowers less coloured. The sight of the Mexican Oaks quiets the alarms of a traveller newly-landed at Vera Cruz. Its presence demonstrates to him that he has left behind him the zone so justly dreaded by the people of the North, under which the yellow fever exercises its ravages in New Spain.

" This inferior limit of oaks warns the colonist, who inhabits the central table-land, how far he may descend towards the coast, without dread of the mortal disease of the vomito. Forests of liquid-amber near Xalapa, announce, by the freshness of their verdure, that this is the elevation at which the clouds suspended over the ocean, come in contact with the basaltic summits of the Cordillera. A little higher, near La Banderilla, the nutritive fruit of the banana tree comes no longer to maturity. In this foggy and cold region, therefore, want spurs on the Indian to labour, and excites his industry. At the height of San Miguel pines begin to mingle with the oaks, which are found by the traveller as high as the elevated plains of Perote, where he beholds the delightful aspect of fields sown with wheat. Eight hundred metres higher, the coldness of the climate will no longer admit of the vegetation of the oaks; and pines alone there cover the rocks, whose summits enter the zone of eternal snow. Thus, in a few hours, the naturalist, in this miraculous country, ascends the whole scale of vegetation, from the heliconia, and the banana plant, whose glossy leaves swell out into extraordinary dimensions, to the stunted parenchyma of the resinous trees."—*Political Essay on the Kingdom of New Spain*, translated by Black, vol. ii. p. 251—2.

In accounting for the tropical endemic becoming epidemic at particular seasons, the eminent traveller just referred to, farther shews the intimate connexion, on the coast of Mexico, between the progress of the disease, and the temperature and state of the seasons: and, accordingly, that, at Vera Cruz, the *vomito prieto* does not commence generally, till the medium heat is 75° Fahr. It is, therefore, seldom seen in December, January, and February, unless it has been very violent in the Summer, when it continues more or less through the Winter; but, as he observes, although it is hotter in May, its ravages are more dreadful in September and October, because a certain duration seems necessary to develop its full force; which must, moreover, be augmented after the rains have ceased, which last from June to September, as well as be influenced by the direction of the winds. The same increase of disease, I may remark, is observed in the islands, during the hurricane months; and this is also in proportion as the previous weather has been useasonable; but the medial heat at which the disease begins to be prevalent, may be calculated at, at least, from 5 to 10 degrees higher; from which it may be deduced, that, in proportion as the air is more loaded

with miasmata, as on the Atlantic shores of New Spain, the disease may become active at a lower temperature, than when these effluvia are less abundant and concentrated; and it may further account for its appearance beyond the tropics, during the summer heat.

In proof of the effect of seasons, I have now before me a letter from Doctor M'Arthur, who ably conducted the Naval Hospital at Barbadoes for several years, corresponding with his report to the Medical Board in September, 1809, in which he says:—" I remarked, while at Barbadoes, that the fever was more frequent, and more violent when the rains were partial, than when continued and general. The heat of the sun produced the decomposition of animal and vegetable substances more rapidly when the earth was slightly moistened by rain, than when perfectly drenched. In these years, when the rain fell abundantly during the months of June, July, and August, the fever did not appear until September, October, and November. On the contrary, when June, July, and August, were comparatively dry months, the fever invaded us earlier.—We know in Europe that the effluvia from marshes are more deleterious a week or two after the beginning of dry hot weather, than immediately after the rains are over; the first evaporation from the surface of the marsh being innoxious, compared with that which afterwards follows." Upon the same principle, as has been well explained by Dr. Bancroft and others, it is not during excessively wet or dry seasons, but some time after the rains, or after partial showers, that marshy effluvia are most abundant and concentrated, as I saw dreadfully exemplified in the garrison epidemic at Mariegalante, in the Autumn of 1808. At certain seasons, therefore, in hot countries, wherever there are vegetable and animal life and decay, even though no water be stagnating on the earth, the whole flat surface may be considered as a marsh; and, consequently, there can be very few situations, as I mentioned at the commencement, exempt from the occasional influence of such miasmata.

It is only by tracing its connexion with the seasons, then, that we can rationally expect to unfold the laws of the tropical endemic, and such topographical hints as I have here offered, if followed up, I should hope would materially contribute to this end, although the peculiar and intimate combination of circumstances, as well as its sporadical occurrence, must often depend upon causes so minute as to elude all investigation.

The degree of exemption from the disease will be, generally, conditional, and contingent upon various circumstances; for though indemnity to a considerable extent may be purchased by a previous attack, or by mere length of residence, yet such protection, is but relative, and, though a sufficient security against ordinary causes, is not proof against such as are of great intensity.

The Circe frigate, after having been several times at Antigua, and escaping with a limited number, or only individual instances of yellow fever, by putting to sea before it became general, entered English harbour,

which was then healthy, on the 4th of January, 1808, no man requiring medicine. In five days afterwards the fever appeared, and, from being engaged in the unwholesome duty of clearing the hold, and heaving down, between that period and the 2nd of February, 146 men were sent to the hospital, of which number 22 died with black vomit, although it was then the healthiest season of the year, and the ship had been nearly two years and ten months in the West Indies.

Still, though the immunity was far from amounting to insusceptibility, the danger here was much lessened by partial assimilation; for it may be fairly inferred, that the mortality would have been much greater if the ship had been recently from England.

A great proportion of these men had suffered previous attacks of fever; and I think there can be as little doubt, that some of them, at least, would have terminated in the same way, if they had not been controlled.

As the degree of immunity will be modified by various circumstances, so will the success in the treatment of the yellow fever be modified by season, situation, severity of the attack, habit of the patient, &c. But, without entering into any detail upon the mode of cure, which I have treated of elsewhere,* and which is ably laid down in the following pages by others, I shall content myself with observing shortly, that though success will be greatly influenced by locality and constitution, and though the symptoms of this malady do not always permit, nor can they, where they do authorise, be always arrested by the copious abstraction of blood; yet I feel justified in saying, that it is only from this remedy, employed while the fever is forming, or within a short time after it is formed, aided, of course, by purgatives, and by the cold affusion, if indicated, that we can entertain any plausible expectation of arresting a disease where the morbid motions are of such inordinate power and rapidity. In making this remark, I more particularly allude to that which I have most frequently witnessed, the ardent continued form of this disease, where the deceitful pause, during the transition from one stage to the other, has been so often mistaken for a remission. To admit the effects of the morbid action upon the stomach, contiguous intestine, and brain, often in the course of a few hours, would appear to me equivalent to admitting that we could only rationally hope to counteract them by such powerful means, provided we put aside preconceived opinions and theory.

The ability with which men bear the loss of blood, I have already allowed very much to depend upon habit and locality; and its efficacy entirely on the early stage of the disease.

In situations peculiarly pestilential, or where, from concentration of cause, the animal energy is so far depressed, as early to incapacitate the

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* Edinburgh Medical and Surgical Journal, vol. 9th.

functions for the performance of those duties by which life is supported,—or after sufficient time has elapsed to have allowed the establishment of fatal congestions,—I do not pretend that there is any hope of these being removed, but, on the contrary, death will be accelerated by the use of the lancet. All I mean to say is, that, during the first stage, at least in the shape in which I have most frequently seen the disease, and while the progress of inflammation in the most vital parts is rapidly proceeding, yet still remediable, I am acquainted with no other remedy which has either time or power to save them from disorganization.

Having had but too many opportunities of being convinced of the want of commensurate efficacy in those inerter means by which the fevers of temperate climates are often conducted to a safe termination, I feel perfectly satisfied when I hear of great success in the treatment of this disease, either that results so fortunate have been the reward of a prompt and decisive plan of treatment at the very commencement, or that the disorder was of a far milder and more remediable nature, than that which I have been accustomed to under the name of yellow fever. Would to God I could say, that the most prompt and decisive measures will be generally attended with success; but I may say, that this will almost entirely depend upon the earliness of their application; or upon the judgment to determine when the disease has so far advanced, that they are no longer applicable, and must be succeeded by an immediate, and entirely opposite mode of treatment.

The mediocrity of remedies often causes them to retain that reputation which they have previously, and sometimes unjustly acquired; but the power of a remedy so active as venesection, yet whose utility is so entirely dependent, not only on time and quantity, but on the varying state of the system, is in continual danger of being rated too high or too low. I am sorry, therefore, to observe, that it is spoken of with too much confidence by some writers, because this tends, on failure, to bring its character into disrepute with others, though it oftener suffers from the opposite extreme of unfounded apprehension.

Upon the now undisputed and general utility of purgatives, it is quite unnecessary to say any thing here: They have not only the great advantage of being eminently serviceable where bloodletting is proper, but where it cannot be resorted to, and in a vast variety of milder cases of fever, where it is not required.

The general healthiness of the West Indies, as well as of particular Islands, varies considerably in different years, and at different periods. It is liable to be affected by certain states of the air, as unusually wet, or dry and close, or otherwise unseasonable weather for the time of the year, by calms, by variations (especially to the southward) from the usual trade winds, and in the quantity of the electric fluid, and, in certain years, by what has been termed "an Epidemic Constitution of the Atmosphere."

Individual safety in the Western Hemisphere will be best consulted by attending to the comprehensive maxim of Celsus—viz. by avoiding various predisposing and exciting causes, until the physical sensibility of the system is reduced by habit; and in proportion as this advice is adhered to, the naval practitioner may be assured, that not only the chance of sickness will be greatly diminished in his own person, but that in a well-regulated ship, aided by the earnest and judicious co-operation of the officers, the lives of the men under his charge may be preserved to an extent beyond his expectations, in ordinary seasons and circumstances.

During war, indeed, when the influx of unassimilated constitutions is considerable, and especially after much exertion and active service, great sickness and mortality are, I fear, unavoidable; but, generally speaking, the result will depend upon the number of Europeans introduced, the time and situation chosen, and the exposure being limited at first, and gradually increased, or otherwise. It is, therefore, of the utmost consequence that bodies of men, whether soldiers or sailors, should arrive in that country at the coolest season of the year (and if such can be selected as have previously served in a warm climate, they should invariably be preferred); that the former should be sent to the healthiest islands or positions at first; gradually exposed to duty under a vertical sun, and instead of being quartered in the low, hot, alluvial ground, in the vicinity of the towns skirting the leeward bays, that their barracks should be built on hills of moderate elevation, sufficiently distant from marshy, damp ground, infested with insects, and from thickly-wooded ravines, where the rank and luxuriant vegetation bespeaks the existence of exhalations unfriendly to health.

The importance of such selection was eminently exemplified by the saving of health and of life that accrued from the erection of new barracks for the troops in a more interior and elevated situation, after the capture of Guadaloupe, in 1810, by Admiral the Hon. Sir Alexander Cochrane, then Governor of the Island. The humanity of this measure, and the judgment previously displayed by the Commander-in-Chief in the site and construction of the Naval Hospital at Barbadoes, &c. have been warmly and deservedly eulogized by the most experienced men in both services: suffice it to mention the names of Drs. Jackson * and M'Arthur:—to me it may be permitted to pay a not less just and earnest tribute of respect to that unwearied benevolence which prompted his immediate attention to every proposal for the welfare of the seamen, and insured not only his concurrence, but active co-operation in whatever could add to their comfort in health, or alleviate their misery in sickness.

The healthiness of the ships stationed in the Caribbean Sea, will very

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* Vide Jackson's Sketch of the History and Cure of Febrile Diseases, 1817.—Pp. 386—and 392-3.

much depend upon the state of discipline and degree of attention paid to the crews. It will be especially preserved by staying in harbour as little as possible; and by cruizing to the northward, or resorting to Halifax, or elsewhere, during the hurricane season, or when repairs which will require detention for any length of time in port are necessary. In fine, it will chiefly depend upon avoiding an undue exposure to the sun, rain, night air, fatigue, intemperance, and unwholesome shore duties; and upon attention to different regulations and preventive measures, of which I have had ample opportunities of appreciating and stating the value, from the inspection, and the medical reports, of generally between sixty and seventy vessels of war.

Many of these being of a local and temporary nature, it would be needless to specify here; but I may shortly notice that the intermission of labour during the hottest hours of the day, working as much as possible under cover, giving a portion of cocoa before going to duty after sunrise, wearing flannel, enjoining a soluble state of the bowels, serving spruce beer or sound wine instead of rum, and when this could not be done, issuing the latter of a certain age and quality, and finally (for of the victualling, in the improved state of the navy, it is unnecessary to speak), the adoption of every means to diminish the frequency of intoxication, were the chief of those measures from which the most beneficial effects were observed.

But of all occupations, the most desirable to avoid is that of clearing a foul hold in the West Indies; and, therefore, whenever it is possible, ships requiring this to be done should be sent out of the country: for not only is it highly dangerous in itself on account of the noxious gases disengaged, but because it is generally necessary to perform it in a secure or land-locked, and consequently unhealthy harbour, such as that of Antigua.

Where the subject is of such importance, though at the risk of tautology, I request leave, in conclusion, to repeat, that the bad effects of staying in port too long at one time, and of harbour duties, particularly early in the morning and after the setting of the sun, as well as during his meridian power, cannot be too strongly adverted to; and, therefore, a measure of paramount importance is the employment of negroes, natives of the country, or at least of men accustomed to the torrid zone, in wooding, watering, transporting stores, rigging, clearing, careening ships, &c. and, in fine, in all such occupations as must subject men to excessive heat, or deleterious exhalations, which cannot fail of being highly dangerous to the health of the unassimilated European.

But the great object, I conceive, is to relieve the ships on that station (the prospect of which, alone, has a wonderful effect on the health and spirits of the men) so often that a foul state of the hold, and the necessity of cleaning it in that country, shall as seldom as possible arise. During

the most active period of nearly eight years of the war, considerable sickness and mortality must necessarily have occurred; but, in that time, I have likewise had the great satisfaction of witnessing, in various ships, and on various occasions, that a degree of health was maintained in that climate beyond my most sanguine expectations,—particularly latterly, when the season of active warfare being past, the necessity was precluded, and, consequently, the unwholesome duties of clearing the hold, heaving down, or undergoing lengthened repairs in the close harbours of the West Indies, were interdicted; and I am, therefore, led to conclude, that to avoid the stronger exciting causes of yellow fever, is to a great extent, to escape the disease.

Observations on the Locale of Yellow Fever, by Dr. Fergusson, F.R.S. Ed. Inspector of Military Hospitals.

The principal West India towns and garrisons for the troops are situated on the leeward shores of the country, at the bottom of the deepest bays that can be found, as a protection to their trade against the winds from the sea. The soil must consequently be alluvial, and is often marshy. Nine-tenths of the towns are enclosed by high hills, rising immediately behind them, which exclude the sea-breeze that, in its natural course, ought to reach them from the windward side of the country. As their elevation is generally little above the level of the sea, we have abundant reason to conclude, that if the highest degrees of reflected tropical heat, defective perflation, and the miasmata that reside in marshy soils, or may be formed in the drier alluvial ones by heavy rains, can produce aggravated remittent fever, it must happen under such circumstances, especially where police and cleanliness are entirely disregarded.

The settlements of the planter, in like manner, are formed, not on the elevated mountain ridge, from which the periodical rains have washed away the soil, but in the alluvial ground beneath, where his labour can with more certainty be turned to profit. Nor is it to be wondered at, under such circumstances, that a body of raw troops or young civilians, come to settle in town or country, should be swept away by tropical fevers. The wonder is, why it does not happen with more unerring certainty; for there are seasons, and even courses of seasons, under apparently similar circumstances of heat and moisture, when even the declared swamp is comparatively innoxious to the newly-arrived European, and still more so to the seasoned inhabitant. This begets in the young adventurer or hardened votary of wealth, a fatal delusion of confidence, which, though so often exposed by the melancholy recurrence of fatal fevers, is never cured.

The pestiferous quality of miasmata does not appear to depend *neces-*

sarily either upon aqueous or vegetable putrefation, however frequently it may be found combined with both. Every one knows that the miasmata are not generated from the body of the lake or pool, but from its drying, or half-dried margins. The swamp is no more than this margin rolled up under another shape. Water, without being absorbed by the subjacent soil, gives out no febrific effluvia. One of the healthiest quarters in the West Indies is that of the field officers on Berkshire Hill, the bed-room of which is placed over a deep stone reservoir of water. But this said febrific miasma is very certainly generated from the *paucity* of water where it has previously abounded, provided that paucity be short of actual dryness. To the production of this a high atmospherical temperature is indispensable;—and in proportion to the intensity of temperature is the intensity of power in the miasma produced, varying its effects on the human frame, from the ordinary ague of Europe, and the West India mountain fever, to the highest degree of remittent and yellow fever, which is never found remote from the level of the sea. It is comparatively innoxious to those who have had the good fortune to become habituated to its influence; and attacks, with singular peculiarity of selection, the robust, the young, and the healthy, in their first approach to its abode. If these be granted, I think we may be able to explain from the various compositions of soil, its elevation, aspect, and temperature, as affording capacity to retain moisture, why every dry one can be brought, during an uncommonly wet season, through the influence of tropical heat, into the state of a marsh that gives out noxious vapours; while a marshy one approaching to dryness through previous drought may be made perfectly healthy from the same abundant rains. Thus Barbadoes, which, from its cleared calcareous soil, is far more salubrious, in general, than Trinidad, has been lately afflicted severely with the worst forms of yellow fever; while the latter island remained perfectly healthy. In both places it has rained abundantly—particularly in Trinidad, whose extensive marshes have been overflown; while the alluvial soil on the shelves of table-land at Barbadoes has been converted into a temporary swamp. So at St. Lucia, when the garrison on the lofty position of *Morné Fortuné* is healthy during the fine dry weather, the inhabitants of the town of Castrus, at the base of the same hill immediately below, and within half cannon-shot, are visited by the worst fevers, and *vice versâ*:—The dry weather gives activity to the miasmata which the rains dilute, refresh, or condense, at the same time that they are forming pools and temporary swamps on the shoulders of the hill, immediately beneath the barracks, on the summit of Morné Fortuné.

So a deep ravine, impervious to the rays of the sun and free current of air, that has been a water-course, may still, after its surface appears dried by the Summer heat, retain sufficient underground moisture to give out the most dangerous miasmata—the more dangerous because the more con-

centrated for want of perflation; and so, in fine, salubrious and insalubrious soils may, under such circumstances, change places, in regard to health; and localities in the neighbourhood of each, under the same modifications of climate, be very differently affected.*

It has been inferred that yellow fever belongs to a different family from that of intermittent, because it seldom occurs at the same time with, or breaks off, in convalescence, into ague. Ague, indeed, is not a common production in the hot low-land on or near the level of the sea—where alone the yellow fever is found. It is very rare, for instance, to hear of an ague originating in the leeward sea-port town of Basseterre, Guadaloupe, either amongst the troops or inhabitants; but, in the barracks on the cool marshy hills above the town, at an elevation of less than a thousand feet, it is a very common disease among officers and soldiers, while their comrades in the town are devoured by concentrated remittents. The same may be said of nearly the whole of the West India towns. They are all so marshy, that, in colder latitudes, they could not possibly escape agues, which, however, very seldom originate, and are nearly unknown amongst them. The inhabitants of Barbadoes boast that they are exempt from agues, though the island has several marshes. Thus the reason is plain:—There are very few ridges there of sufficient elevation to belong to the region of intermittents, even supposing their sides to be marshy, which they never are. The swamps are all in the lowest levels of the land; and when their morbific miasmata act upon the human body, they produce the greater or less concentrated forms of remittent fever, according as their powers are regulated by the temperature and climate of the season, or as the subject is presented under more or less favourable circumstances of seasoning, excitement, &c.

I am far from presuming to deny, says Dr. Fergusson, that there are fevers from pure excitement; "*for soldiers and others have been attacked and died of yellow fever before they landed in the West Indies, or could be exposed to the influence of land miasmata in any shape.*" From this it would appear that a calenture [the synocha of Cullen], the pure offspring of heat, as pneumonia is of cold, runs a course similar to the yellow fever.

"To the argument, that the highest degree of concentrated remittent or yellow fever should neither remit nor break off into ague, it seems sufficient to reply, that for any disease to observe regular laws, it is necessary that

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* The reader is probably aware that some authors, as Dr. Jackson and Mr. Doughty, consider an excess of the principle of vegetation as the cause of fever: "It would appear that the materials of vegetation abounding in excess, acted upon by a powerful cause, give out a principle, which, not being expended in the growth and nourishment of plants, is diffused to a certain extent in the atmosphere, occasioning a derangement of such bodies as come within the sphere of its action."—*Jackson's Outline of the History and Cure of Fever.*

the vital organs principally affected should continue in a certain degree of integrity; that their functions should only be disturbed and perverted to a given point; that they should still be discernible as functions, and not be utterly overwhelmed and extinguished by the violent cerebral action and speedy gangrene of the stomach that take place in aggravated yellow fever. As the ulcer of a specific poison that would run a regulated course, according to acknowledged laws, if it be driven to a high inflammation or sphacelus, no longer belongs to the original stock, and is emancipated from those laws; so the violent actions of the above fever impair and destroy the animal functions by which its crisis and remissions are regulated, or speedily engender a new disease; as new as the conversion of an ordinary venereal chancre into a phagedenic slough through the application of a potential cautery."

I may refer to the section on *Bilious Fever*, in the first edition of my work, for a similarity of doctrine.

By *Malaria* Dr. F. means to express something that is more decidedly than miasmata the product of underground moisture, which can only be sublimated, so as to produce its specific effects, by long-continued solar heat—a more subtle miasm, in fact, of which the surface gives no warning, but of which the existence is proved from its effects on habitations that are placed in the drought of the dry ditches of forts, no matter how rocky or dry, if they are deep, and also of deep ravines. At Fort Matilda, in Basseterre, Guadaloupe, a well-raised artillery store-house and guard-room, placed in Bouchure, at the confluence of two of the ditches, was found to be utterly uninhabitable. The same malign influence affected the houses that were placed opposite the deep ravines of rivers, no matter how pure and pebbly the channel, as also all the dwellings situated on the leeward base of the mountains.*

It would also appear that these effluvia, during certain states of stagnation of atmosphere, as during the sultry calms of the hurricane months in the West Indies, *accumulate* in the dirty, ill-ventilated streets of West India towns, to the danger of all who are unseasoned to their influence. Here *strangers* will have the highest degree of ardent fever. It is probable, too, that the healthiness of seasons in unhealthy climates, depends less on the *amount* of heat and moisture, than on the *ventilation* of the climates by powerful, regular trade winds, like the trade winds between the tropics; for whenever these have been withheld for a time, the accumulated morbific emanations from underground moisture will act upon the human body, like the accumulated typhoid principles in crowded hospitals, when undulated with a due proportion of atmospheric air.†

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* See the section on Sicily.

† See Dr. Fergusson's paper in the *8th vol. Med. Chir. Transactions*, from which the above has been abstracted and condensed.

I shall conclude this section with some observations on the fever of Mariegalante, in the West Indies, communicated by Sir David Dickson, of Plymouth Hospital.

The history of the fevers at Mariegalante, from July to December, 1808, is not only well calculated to shew the destructive powers of concentrated marsh miasmata, in tropical climates, at certain seasons; but also the modifications of fever which arise according to intensity of cause, locality, atmospherical vicissitudes, epidemic influence, or degree of constitutional predisposition. The difference of effect, however, as marked by difference of type, or anomalous appearances, is here particularly worthy of attention, because the men were limited to a small space, insulated, and exposed to the same causes which were strictly local and indigenous, but affected by differences of temperament or habits, degree of habituation or exposure, and other relative circumstances. I can, however, only propose here to give a hasty and imperfect sketch of the sickly period in question, owing to deficiencies in the reports during the illness of the successive medical officers, and the space and time it would occupy minutely to analyze those in my possession. For some months after the capture of the island, the marines composing the garrisons enjoyed a very fair degree of health; but, from the beginning of July (the usual commencement of the sickly season there), after heavy rains, succeeded by intense heat, fever became daily more frequent in occurrence, and aggravated in character. Upon my arrival on the 29th of the same month, I found the disease had made such progress as caused me to entertain the most painful apprehensions for the fate of the garrison. It originally consisted of only 350 men, and there were then 150 on the medical list, 40 of whom were affected with fever, 15 with dysentery, and 75 with ulcers, many of which, owing to the sickness of the surgeon, and the accumulation of cases, had attained a considerable degree of malignancy. Of the first disease, many had the yellow or endemic fever of the West Indies, in its most aggravated form, with black vomit; in others it was of a more protracted character, and with symptoms more resembling those of typhus; while the remainder had remittent or intermittent fevers. On my first view of the sick, and of the low swampy situation of the town of Grand Bourg, together with the season of the year, I was impressed with the most unfavourable anticipations, and represented to the Commander-in-Chief, that, although I had expected to find much sickness at Mariegalante, I had not been prepared for the conclusion I was then obliged to form—viz. the total reduction of the strength of the garrison in the course of the hurricane months, unless the sickness could be arrested. That my prognostic was but too accurate will appear in the sequel. The closest inspection, on the following day, tended but to confirm and extend this conclusion: my report expressed the grief with which I offered my opinion that the garrison would be shortly incapacitated for

any duty; and that the only chance of averting this, depended on the adoption of measures of the greatest promptitude and energy.

The first object was to remove, as far as it was possible, both the sick and the well from their unhealthy habitations; rendered still more noxious by the accumulation of disease; and where this could not be effected, to cleanse and purify the apartments, and to arrange and separate the sick, &c. The next considerations were the clearing away of whatever was filthy and offensive around them; the employment of negroes for this and various other fatiguing and dangerous duties; the avoiding of exposure to the sun and rain; a more regular supply of fresh diet, and of wine and spruce beer to the troops instead of rum; and, lastly, the adoption of every measure which could prevent the facility of intemperance and excess with noxious new spirit. A more elevated situation was procured for the convalescents on the hill; and a large house on the sea-shore to the eastward, and consequently generally to the windward of the swampy grounds, was selected for an hospital; but the latter, owing to reports of its insalubrity, and other difficulties, was never occupied; though I was decidedly of opinion, that the removal of the men anywhere was preferable to their remaining in their former situation, which had been replete with disease and death. After making those arrangements, Dr. Mortimer, then surgeon of the flag-ship, who had handsomely volunteered his services, was left in charge of the sick; and according to his official report, published in the Nineteenth Number of the Medico-Chirurgical Journal, for the first two or three days, such was the amendment produced by the measures concerted, that a considerable diminution of disease was calculated upon. But, alas! the remission was but temporary: the men could not be removed beyond the reach of noxious exhalations, emanating in all directions from the low swampy ground, covered with rank vegetation; the concentration of the marsh miasma; and the predisposition favoured by apprehension and irregularities, increased daily, and the fever proceeded with augmented power and rapidity, until it had swept off half the garrison. The aspect of the country, Dr. Mortimer observes, "seems particularly favourable to such exhalations. On viewing it, you almost constantly find hills of easy ascent, intersected by lesser declivities, and these on both sides encompassed by swamps; so that, whether in the interior or the town sickness nearly equally obtains." The enemy, taking advantage of the disabled state of the garrison, attacked the island on the 23rd August, and although in a short time it was re-captured, and re-inforced by fresh detachments, the sickness was necessarily much increased by the fatigue, exposure, and irregularities incidental to warfare. Many of the old, as well as the new troops, were seized with the fatal fever: indeed, the worst cases were second attacks, brought on by exposure and excesses, and, by the end of September, this ill-fated little garrison had lost by disease 234 men. As a most faithful description of the yellow fever by Dr. M'Arthur appears elsewhere, and as

Dr. Mortimer's report on the endemic in question has been inserted in the Medico-Chirurgical Journal, as above noticed, I do not propose giving any further account of it here.

The only treatment which appears to have had any effect was that of bloodletting and purgatives, if resorted to sufficiently early; but even these measures were inefficacious unless employed at the very commencement; and, after what has been said, it is hardly necessary to add, that the power and rapidity of the disease were too often such as to set medical control at defiance; indeed, in its highest grade, there is so little chance and time for the interposition of our art, that it may almost be considered irremediable; and, in some instances, men, who complained of headache and giddiness in the afternoon, were dead by the next morning.

Dr. Mortimer was taken ill before he had finished his report, and was received on board the flag-ship in a state of extreme danger, from which he with difficulty recovered.—He was succeeded by Mr. Waller (who, like his predecessors, suffered much from the unhealthiness of the situation), and from whose communications chiefly I have extracted the remaining account of disease at Mariegalante. The yellow fever declined towards, and indeed altogether ceased by the end of September, when the season became rainy; and it was succeeded by cases of a protracted description, extending to the period of twenty days, or longer; and though characterised by some peculiar and anomalous appearances, with symptoms much resembling those of typhus. During the months of October and November, the weather was wet and squally; and there was comparatively but little fever, with the exception of quotidian intermittents, which were by no means severe, and yielded readily to the moderate use of bark. In December, the tertian became the prevalent type, but early in this month intermittent paroxysms occurred of an alarming character, and of such an intensity, that, in some cases, after one or more attacks, the patient was carried off by coma and convulsions. In this way seven men died within twenty-four hours; and some even in a much shorter period, so as at first to induce a suspicion of poison. The symptoms may, in some, have been partly attributable to their having taken a large quantity of rum, with the view of preventing the ague; but they also occurred in others who had not tried this pernicious experiment. In one man, who died in about two hours, a green sediment, supposed at first to be some poisonous vegetable, was found in the stomach. In others who were opened, however, no such matter was discovered; but only a bilious-looking fluid, similar to what was ejected by many, but not by all, before death. In almost every dissection a large quantity of this fluid was found in the stomach, dyeing every thing it touched of a very deep yellow colour—very turbid, saponaceous, adhering to the sides of the vessel, with an odour of ammonia so strong and pungent, as to excite the olfactory nerves, and appearing to be particularly acrid; but not at all resembling the matter with the green

sediment above-mentioned, nor the black vomit of yellow fever, nor even the yellow fluid which is first thrown up in that disease. The action of this fluid on the nerves of the stomach seemed to be the cause of the comatose symptoms which came on, soon after the invasion of the paroxysm, or at the commencement of the hot stage; as, whenever an emetic was previously given, a considerable quantity of it was brought up; but the remedy seemed also to increase the secretion of it; for as much would be ejected in the course of the succeeding day as had been discharged by the emetic.—In the greater number, the comatose symptoms did not appear till after the patient had sustained two or three paroxysms; many, however, died in the first paroxysm, when the coma did appear, but more in the second paroxysm. To this account of the severity of the disease I can well give credit, from the cases which fell under my own observation, while at Mariegalante. In one instance I recollect to have seen a man in whom not only, as mentioned by Senac, the hot and sweating stages occurred together, but all the three stages seemed to be concentrated at once; for while his teeth were chattering and his body shivering from the sensation of extreme cold, his skin felt excessively hot to the touch, and large drops of perspiration were standing on his face and breast.* When the disease was of the tertian type, Mr. Waller observes that the symptoms lasted about thirty-six hours, or until about two o'clock in the morning of the day after the attack; when of the quotidian type, the duration was about eighteen hours, and somewhat milder, but the intermissions, being only six hours, were less complete than in the tertian paroxysms. In the latter part of the paroxysm, the pulse and temperature of the skin sunk remarkably low, as in the fever about to be described; but they rose again during the apyrexia, nearly to the natural standard, and the patient then complained chiefly of debility. In every instance, where the patient survived the second shock, he recovered ultimately, but seldom without having had six or seven paroxysms. In this disease, denominated by Mr. Waller, "*the comatose intermittent*," his practice was to give an emetic an hour before the accession of the attack, which appeared of considerable service in mitigating it: a blister was applied to the head, and sometimes between the shoulders, and the bowels were kept very open with calomel. His principal reliance, however, was on mercurial frictions repeated every hour; and by this remedy he thinks many lives were saved, though in one instance only was ptyalism the consequence of it. When the paroxysm ceased it was discontinued; and the bark was substituted. The patients continued long in a state of convalescence; and frequently shewed symptoms of diseased spleen. Towards the end of November the northerly

* Besides Senac, Cleghorn, Stork, Pringle, Frank, Burserius, and various other authors adduce instances where the order of the paroxysm was deranged, or some of the stages wanting, and of various anomalous appearances in intermittents.

winds set in; vast quantities of rain fell during the night; and soon afterwards, that is early in December, fever became prevalent. This fever occurred at the same period, and, in some respects, bore a strong similitude to the aggravated intermittent above described; but it was of a different type, and appeared, in duration and symptoms, to be intermediate between yellow fever and typhus. As this fever was characterized by the supervention of extraordinary symptoms, viz. coma, reduction of temperature, and periodical vomiting, I shall give a more particular account of it, as it is described, though more summarily than in the minute, and I have every reason to suppose, faithful report of Mr. Waller.

Description of the Fever.—The patient complains of being taken ill in the evening; but, upon more minute enquiry, it is generally found that a slight headache was felt in the morning, with a sense of lassitude and pain in the limbs; which symptoms were relieved at dinner, but returned, in an increased degree, about sunset. Slight rigors then occur, and are often felt for some time after the heat has accumulated on the surface of the body; they generally continue about an hour, when the temperature becomes steady; though at a lower point than is usual in the commencement of yellow fever, and considerable thirst and anxiety succeed, while the face and general surface become flushed; and the bloodvessels of the eye turgid. The pulse is now full, firm, and frequent; but the skin, though hot, is seldom without some degree of moisture and softness. Perspiration usually comes on early, and continues free and general during the remainder of the paroxysm, which ceases about two or three hours before day-light. The patient then falls asleep for some hours, and awakes refreshed, and with a considerable remission of all the febrile symptoms; the pulse is now less full; but still frequent and often irregular; and the tongue, which was merely white before, is found thickly coated with mucus, whitish round the edges, but very foul and brown in the middle. The patient complains now only of debility, and a dull heavy sensation of the head, increased on motion, and shews a propensity to sleep. The apyrexia continues till about noon, when the same febrile symptoms recur, but increased in violence and duration. The remission next morning is less complete, and the exacerbation comes on earlier. In general there is no third remission; the fever becomes continued, and is early accompanied by great irritability of stomach, beginning with vomiting of bilious matter, and afterwards of every thing that is taken, with very distressing retching, uneasiness, and pain, when it is empty. The dull heavy pain in the forehead, with vertigo on motion, is always complained of, which, with the pains of the limbs, generally continues through the disease. The bowels are, for the most part, relaxed, sometimes very loose, and the stools watery. The patient most frequently continues in this state four or five days, when a new train of symptoms appears, which gives the distinguish-

ing character to this fever; sometimes, however, they appear earlier; at others, not until signs of convalescence have occurred. The first symptom is a remarkable degree of stupor; the patient displays the greatest indifference to every thing around him; is with difficulty aroused to answer questions, or to take any thing; and seems much disconcerted at having been disturbed. The pulse, which was before tolerably full and firm, sinks rapidly, and throbs with a quick unequal motion under the finger; sometimes it is scarcely perceptible, and not unfrequently it cannot be felt at the wrist at all. The heat of the surface, too, generally subsides, but in this stage it is very variable, though there is reason to believe that if the patient were left to himself he would become quite cold; indeed, this coldness of the skin is very remarkable in a great number of cases; and, in some, appears to be beyond what is felt in the living body under any circumstance, yet the patient does not appear to feel any uneasiness from it. With this extraordinary reduction of temperature, the skin is not anserated, but cold and clammy; and it sometimes continues for several days. The tongue is now found to be dry and hard, and the teeth and lips become covered with a dark-coloured fur. The patient appears to sleep much during the day, or rather he lies in a kind of stupor without sleeping, but at night is, for the most part, delirious. He now seldom complains of pain, or only in the region of the stomach, where it is sometimes very severe. The vomiting, at this period, often subsides; but frequently, also, it comes on every day about the same time, and is attended with very painful spasmodic contractions of the stomach. This periodical vomiting observes its periods with great regularity; is a very untractable symptom, and little susceptible of alleviation by any remedy that has been tried. The vertigo is also exceedingly distressing, and increases so much in an erect posture, that the patient immediately falls down; and even when recumbent he complains of the giddiness, or a very unpleasant sensation in the head. It sometimes continues after the other symptoms have disappeared, and is always extremely tenacious. The symptoms just enumerated continue three, four, or five days; and then gradually subside. But this, though the most favourable, is not the most frequent termination; it oftener happens that the stupor increases to a state of complete coma, or accompanied by muttering delirium, subsultus tendinum, and involuntary discharges. The pulse sinks until it can be no longer felt any where; the whole body becomes cold and cadaverous; and, in some cases, of a deep yellow colour, with no other signs of life than a feeble respiration. Sometimes, at uncertain intervals, the pulse and heat rise, and the patient becomes anxious and restless for two or three hours; then falls again into the former state. But these changes may be effected by the remedies employed, as it is more than probable that they would not so often appear if the patient were left to himself. In this stage, death very frequently happens; but however bad the patient may

be, when the formidable symptoms continue above forty-eight hours; it affords a strong presumption that he will recover; and this sometimes has taken place after he has lain in this state for four days. In such instances, when the system emerges from torpidity, the coma first disappears by degrees, and the pulse gradually rises; but the patients continue for a long time in a state of excessive debility, and not unfrequently fall victims to second attacks, or to dysentery. This disease first attacked many of those who had suffered from concentrated fever in July and August; its average duration is twelve days, when it terminates in a quotidian intermittent, convalescence, or death.

It may appear but little in favour of the plan of treatment, to state, that out of sixty-one seized with this fever, in December, half of them died; yet, when those very formidable symptoms are taken into consideration, it is but fair to infer that remedial measures were not only employed with much advantage in the early, but also in the ulterior stages of the disease, from there being time to put them in practice, according to the existing indications. In the early period of the disease, Mr. Waller observes, it was always considered necessary to lessen the excitement by bleeding, purgatives, and the other parts of the antiphlogistic regimen. But as this stage of excessive excitement was in some cases of much shorter duration than in others, it frequently happened that the patient did not complain sufficiently early to receive much benefit from depletion, or even to bear any abduction of blood. Indeed, symptoms of exhaustion sometimes appeared even in the first paroxysm, and, in a number of cases, no remission supervened; but whenever it was authorized, the lancet was invariably and freely used in the first stage, and always with advantage; in every instance the bowels were well evacuated by purgatives, and by large and frequent doses of calomel. Emetics, he says, were frequently tried at first, but not with so good an effect as was expected from them; and but a very short relief from the nausea was experienced after their use, when this symptom existed, in a considerable degree, in the first stage. Upon this point I shall waive any remarks, as occasionally they may have been useful in the modified disease under consideration; but in the inflammatory and rapid yellow fever, I am of opinion that the exhibition of emetics, or of antimonial, or other nauseating medicines, cannot be too strongly deprecated. In the present case, it was only in the first attack, or during the exacerbation, that the patient could bear any evacuation, except by the bowels, which were always kept very open, so long as the pulse was at all full, or retained any firmness; but when the stupor supervened, he could no longer bear any debilitating process. To allay the gastric irritability, blisters, mercurial frictions, effervescing draughts, small pods of capsicum, &c. were employed, but generally with very little effect. The best remedy seemed to be a grain of opium in a pill, repeated according to the vomiting; but even this was often rejected. So soon as

stupor or coma appeared, stimulants were resorted to; blisters to the head, wine, camphor, ammonia, and mercurial frictions; and, in the low state above described, there is no doubt that the friction itself, as well as the remedy, was of service. The delirium was generally immediately relieved by blistering the head. The formidable degree of coma, Mr. Waller observes, mostly came on in the morning early; but he was unable to ascertain whether it was preceded by any peculiar sensation, by which its approach could be certainly known. The prognosis was unfavourable in proportion to the intensity of coma, reduction of heat, and gastric irritability; little dependence could be placed on the circulation. The danger was great when the patient lay in a state of reverie; much greater when there was delirium in the day time than when in the night. In the comatose affection, he speaks in the most favourable terms of mercurial frictions, and adduces their success in some cases considered desperate, when the patient had been lying in this lethargic state for four, five, or more days, with the pulse, for many hours, imperceptible, and the remarkable coldness of skin above described. These frictions require to be frequently and perseveringly repeated; and latterly he was in the habit of rubbing in a drachm or two drachms of the strong ointment every hour; which method seemed preferable to any other. To his opinion of the value of mercury in protracted or congestive cases, after the active stages of fever are past, and particularly to its efficacy in visceral obstructions and derangements which are the sequel of certain fevers, I perfectly subscribe. In many such cases, it is not only a most valuable resource, at a period when we have no other indication to pursue, but also, perhaps, where no other remedy would be successful; but of its inutility, except as a purgative, where there is *high febrile and inflammatory action*, as in the early stage of concentrated yellow fever, I am fully convinced; and trust I need not here deprecate the wasting of those precious moments, when only the disease can be controlled, in fruitless attempts to institute the mercurial action. With respect to the combination of this with the depletory plan of treatment, I am inclined to think that the mercury has often enjoyed a larger share of credit than it has been entitled to; because, in many such cases, it has been indebted for the power of exerting its specific action, to the depletion, which, at the same time, has been employed. When we can command a warm bath, in cases like those above, I need not say how much it would contribute to the object in view: it is to be regretted that there does not appear to have been an opportunity of ascertaining the actual temperature of the skin by the thermometer. With respect to the causes of this fever, Mr. Waller does not offer any decided opinion. It was, at first, attributed to the northerly wind wafting a very offensive odour from the burying-ground; owing to the hasty and imperfect inhumation of the bodies, which was accordingly remedied. The disease certainly began to prevail after the northerly winds set in; but it is unnecessary to add any

etiological observations after what has been said of the abundant sources of deleterious exhalations at Mariegalante.

Tetanus.

This *opprobrium medicorum*, though an occasional sojourner in all climates, has its principal seat and throne between the tropics. The disease, however, is equally fatal, though not near so frequent, in a cold as in a warm climate. According to my own experience, and that of most of my naval and military friends, the *traumatic* is greatly more dangerous than the idiopathic species, though this sentiment does not accord with that of Dr. Morrison, the latest writer on the subject of tropical Tetanus.

The *Symptomatology* of Tetanus is by no means necessary in this place, since it is impossible for the veriest tyro to mistake the disease. Some pathological and therapeutical observations only will here be introduced.

Pathology. Dr. Morrison, in his recent Treatise on Tetanus, asserts that dissection has thrown little if any light on the seat or nature of the disease. But some late papers and investigations would seem to diffuse a ray of light on the obscurity of this pathological track, and induce us to believe that we have too long neglected the morbid anatomy of the spinal cord, the ganglia, and the medulla oblongata, in diseases attended with violent spasmodic affections. Dr. Sanders, of Edinburgh, has long laboured in the development of this dark subject, and not without some success. The harmonious balance, not only of the circulation in itself, but in its relation with the nervous system, has too long been overlooked; but a new light is now breaking in upon our minds from the tomb. The *inequilibrium* in the balance of the *excitement*, which exists in almost all diseases, is here evinced, in characters that can hardly fail to be understood. While the class of voluntary muscles is in complete spasm, various organs—more especially the chylopoietic viscera, are utterly torpid.—This inequilibrium in the balance of the excitement shews itself, even before the development of spasms, in the torpor and costiveness of the alimentary canal *precursory* of, and cotemporaneous with tetanus, as was sagaciously remarked by that accurate observer of nature, Dr. Dickson, in the 7th volume of the Medico-Chirurgical Transactions.

We must, therefore, look to the origins of those nerves which supply spasmed muscles, for the immediate seat of the mischief; and there it will be found without a doubt. Dissections of the base of the brain, medulla oblongata, and medulla spinalis have not, till lately, been prosecuted with any thing like accuracy.

Dr. Reid has now forcibly drawn the attention of the medical world to this subject, and it will no doubt, be well investigated. It has long been remarked, indeed, that, in tetanus, the natural functions are little affected, and the same may be said of the intellectual functions, and those muscles and organs supplied by the nerves of sense. These considerations naturally lead to the conclusion, that the thoracic and abdominal viscera are not primarily affected, and that the origin of the disease is not in the nervous substance supplying those organs—in short, that the cerebral and ganglionic systems are only drawn in *subsequently*, and that the spinal cord is the original and principal seat of tetanus—a conclusion, however, which is reversed by Mr. Swan.

Case in Elucidation [from Dr. Reid].—A boy 14 years of age, after receiving a severe bruise in the toes of the right foot, was exposed to the vicissitudes of the weather in the month of February. He was seized, four or five days afterwards, with tetanus, and died in thirty-six hours. *Dissection.*—Viscera of the abdomen and thorax perfectly sound, as were all the muscular parts. On opening the spine, *from the back part*, and on raising the nervous mass (with its dura mater entire) from the spine, " there appeared a considerable effusion of blood in the cellular tissue, connecting it to the upper lumbar and lower dorsal vertebræ. A similar effusion occurred also along the bodies of the upper dorsal and two lower cervical vertebræ. On slitting up the dura mater on the anterior surface, the nervous mass appeared highly vascular, and the vessels of every description remarkably tortuous. The only appearance in the nervous substance itself, was a deeper tinge than natural in its cortical and medullary parts."

From these appearances, corresponding with the investigations of Dr. Sanders, it follows that tetanus is radically an inflammatory disease. But general bloodletting here will not be near so efficacious as local abstractions of blood from the spine—blisters—purgatives—and, finally, mercury and opium, to equalize the balance of the circulation and excitement. The following observations from Dr. Morrison, a late writer on tropical tetanus, may be appropriately introduced here.

Dr. Morrison was led to compose his present Treatise on Tetanus, from having had considerable experience in that disease, during an eight years' practice in the colony of Demerara, where it is of frequent occurrence. The land of this part of the South American Continent is low, flat, and marshy, abounding with swamps, and, with the exception of a stripe along the banks of the Demerari, is covered with trees of various dimensions, whose roots, for a great part of the year, lie imbedded in water. The prevalent diseases are intermittents, fevers, hepatitis, enteritis, rheumatism, dysentery, and, among children, hydrocephalus.

Dr. M. does not look upon tetanus, even the traumatic form, as so very dangerous a disease, in tropical climates, as authors have represented it.

He has witnessed many instances of recovery, both from traumatic and idiopathic tetanus, and, strange as it may appear, the instances of cure in the *former* have been nearly as numerous as in the *latter*. In upwards of twenty cases of this disease which he witnessed among negroes, the pulse was in no instance accelerated in the manner related by Dr. Parry. He has never known it above 98, whether the termination was favourable or fatal.—The following prognostic passage we shall transcribe.

"When the disease comes on gradually; when, for the first three or four days, the muscles of the jaws are solely affected, and that, perhaps, not in any alarming degree; when the abdomen is not preternaturally hard, nor the bowels obstinately costive; when the skin is moist and moderately warm, and above all when the patient enjoys sleep, we may (by the means hereafter to be spoken of) entertain strong hopes of an eventual recovery. An increased flow of saliva, where mercury has, or has not been used, is always to be regarded as favourable; the less the general air of the countenance is changed the better. On the other hand, when the attack is violent and sudden; when the muscles of the neck, back, and abdomen, are rigidly contracted; when the patient complains of a shooting pain from the sternum towards the spine; when the belly feels hard like a board, and the least pressure thereon produces spasmodic twitchings or contractions of the muscles of the neck, jaws, &c., or, when the same effect is brought about by the presentation of any substance (solid or fluid) near the mouth, we have much reason to fear a fatal termination. Spasmodic startings of the muscles set in sometimes early in the disease, and recurring every eight or ten minutes, are to be regarded as very unfavourable." P. 29.

The only disease which tetanus can be confounded with, is rabies contagiosa. In the latter, however, there is generally fever: frequently increased heat of the body. In rabies contagiosa, vomiting is common at the commencement; not so in tetanus. The delirium, too, of hydrophobia is absent in tetanus. The shooting pain from the sternum to the spine is seldom wanting in tetanus or present in the other.

Treatment of Tetanus.—Dr. M. believes that spontaneous cures do occasionally take place in tropical climates. One decided instance of traumatic tetanus giving way to the efforts of nature fell under his own observation. The treatment of idiopathic and symptomatic tetanus is considered the same. For although it is common and proper in the West Indies to apply some stimulating substances, as ol. terebinth. or the like, to recent wounds, together with emollient cataplasms, so as to induce free suppuration, yet, when constitutional tetanic symptoms have once commenced, there is little or no dependence on local treatment. By way of prevention, Dr. Clark advises a slight mercurial ptyalism to be brought on after wounds in hot climates, or under suspicious circumstances. For the same pur-

pose, the complete division of half-divided nerves, tendons, &c. might be proper. The Spanish physicians bathe the wound, for an hour or more, in warm oil, while some subsequently apply lunar caustic, superacetate of lead, &c. The principal general remedies that have been recommended are, the cold affusion, mercury, opiates, wine and bark, the warm bath, cathartics, blisters, antispasmodics. We shall not stop to notice the history of each of these remedies, but give the substance of Dr. M.'s own remarks and experience. During the Doctor's first three years' residence in Demerara, and in the first eight or ten cases, the *cold affusion* was invariably used, but with so little success, that it was ultimately left entirely off, and the warm bath substituted.

Mercury.—Spontaneous salivation has often been observed in tetanic patients whose cases terminated favourably, hence, probably, the first idea of using mercury. In hot countries, tetanus is seldom so rapid as to prevent the introduction of mercury in quantity sufficient to salivate before the disease runs its course, whether favourably or fatally; and as, in all climates, mercury interferes not with other remedies, Dr. M. thinks its administration ought never to be omitted.

" I undoubtedly have had many examples of the good effects from mercury in the cure of this disease. Four grains of calomel given two or three times a-day, with three or four drachms of the ointment well rubbed on the neck and spine night and morning, I believe to be excellent practice. A much larger quantity of the ointment may be used on different parts of the body; indeed, the more continued the friction the better. The constitution labouring under this disease will mostly appear as proof against the usual effects of this medicine; but when salivation can be brought about, it will, in a great majority of cases, be found to be attended with the happiest consequences. Allowing the spontaneous salivation which sometimes occurs to be more the effect than the cause of the cure, still we should be inclined to throw in large quantities of mercury, merely with a view of bringing on any different action in the system."

The submuriate of mercury, with scammony or jalap, as a purge, is also recommended by our author.

Opium.—This appears the sheet-anchor of our author in this disease. He has met with more than a dozen cases where the cure of tetanus could be fairly attributed to this medicine; and he has met with no instance of recovery in which he did not conceive that it bore a principal part. It must be given, however, in very large doses, the system under tetanus being little affected by doses of opium that, in other circumstances, would produce striking effects.

" A practitioner," says Dr. M. " for whose acuteness and discernment I have great respect, gave to an old man, in my presence, who was in an incipient stage of this disease, about *half an ounce* of tincture of opium in

four ounces of rum, as a *first dose*, directing, at the same time, the spirit to be frequently repeated, and the man got perfectly over the complaint in a few days." 57.

Dr. M. directs that an adult should commence with one hundred drops of the tincture (bowels being opened), increasing each succeeding dose one-third every two hours, unless sleep or stertor in the breathing ensue; ordering, at the same time, wine or ardent spirits, in as large quantities as the patient can be induced to swallow. A pint of spirits, or double that quantity of wine in the twenty-four hours will not be too much. Tincture of opium is also to be rubbed on the spine.

The Warm Bath, is regarded by our author in a favourable point of view. It has afforded much present relief on several occasions under his own eye, where the spasmodic twitchings were frequent and troublesome. He depends very little on it, however, and justly observes, that the exertion or movement which the patients must undergo, in order to get into the bath, will often more than counterbalance any good effects that can be expected from it. Patients are so alive to all external impressions, that the least exertion is often sufficient to excite violent spasms. On this account the patient should be kept as quiet as possible, and very few questions asked him. The chamber should be kept darkened, and every thing tending to excite mental exertion avoided.

Blisters, though recommended in high terms by a few medical practitioners, can only be looked upon in the light of adjuvants. The course of the spine appears the best site of their application.

Bark and Wine.—Dr. M. recommends that, during the exhibition of opium, large quantities of wine or diluted alkohol be administered, in order to second its effects.

Recapitulation.—"The bowels should be kept as free as possible. We must endeavour to bring about an operation every twelve hours. This, even by the aid of strong cathartics or purgative injections, will be found very difficult to be obtained; the sphincter ani sometimes scarcely admitting the introduction of a glyster-pipe, and the exhibition of the strongest purgatives may often be attended with little or no effect. Sulphate of soda, jalap and calomel, scammony, pil. aloes cum colocynthide, &c. are as proper for this purpose as any other, aided by stimulating clysters, such as solution of muriate or sulphate of soda, with olive oil; the resin of turpentine, suspended by the yolk of an egg; solutions of soap, &c. I have found it, on two or three occasions, impossible to open the bowels freely, till after large quantities of opium had been taken, which seemed to bring about a general relaxation; or until the system had been evidently under the influence of mercury; and, indeed, these are the two medicines on which we are to place the greatest confidence, in the treatment of this disease; they must be given, however, as before remarked, in large doses, and frequently repeated. I once gave a patient, who is, I believe, still

living, ten grains of opium and twenty of calomel, in pills, and five ounces of tincture of opium, in wine, all in the space of twelve hours.

" Next to opium, I certainly look on the preparations of quicksilver as the most valuable. Large quantities of the ointment may be rubbed in on the spine, neck, legs, &c. with repeated doses of submuriate internally. Wine and ardent spirits should be given freely; indeed, the constitution here appears as insensible to their usual effects, as to those of opium; and quantities which, in a state of health, would produce stupid intoxication, now neither exhilarate the spirits, nor disturb that serenity of mind so conspicuous throughout the disease.

" The *warm bath* will often be found a useful auxiliary; when we expect to derive advantage from it, the vessel used should be so capacious, as to allow the patient to be as little confined as possible, and the water should be sufficient to cover the shoulders completely. I have found a common rum puncheon, sawed across at the centre, very convenient for this purpose.

" I have generally used blistering plasters, but confess I have never experienced much benefit from their application.

" When the disease is conquered, the patient should take wine and bark for many weeks." p. 70.

On the above passage I would remark, that the local abstraction of blood by leeches and cupping from the neighbourhood of the spine, with subsequent blisters there, are not inconsistent with the plan of treatment recommended by Dr. Morrison. For it must be remembered, that such is the unequal distribution, both of the blood and excitability in the system, under this disease, that one part is completely torpid, while another is on the point of extravasation from turgescence or inflammation. It is evident, from this view of the affair, that we must stimulate the torpid organs at the very moment we are employing sedatives and counter-irritants, or abstracting blood from the congested parts. Hence, too, the great value of purgatives and mercury. The former bring back the excitement to the abdominal viscera, and powerfully determine from the spine: the latter sets all the secretory and excretory apparatus to work, while it equalizes the circulation in every part of the system.

Since the third edition of this work was printed, several contributions have been made to the pathology and treatment of tetanus, of which I shall endeavour to give a succinct account in this place, in order that the tropical practitioner may be in possession of the latest information on the subject. I shall notice these contributions in the order of time since the date of the third edition.

1. Mr. Burmester has published, in the 11th volume of the Medico-Chirurgical Transactions, a case of tetanus preceded by fever, and caused, apparently, by exposure to cold and moisture. It was treated at the York Military Hospital, Chelsea, by copious depletion, opium, mercury, and the

warm bath. After ptyalism was raised, the patient was ordered the pulvis ipecacuanhæ compositus. He recovered.

2. The next case which I have noticed happened at Quebec, and was one of traumatic tetanus. The patient was 50 years of age, and became affected with violent opisthotonos, after a wound in the foot by a nail. Messrs. Mercier and Parant bled *ad deliquium*, and exhibited strong mercurial and other purgatives. The bleeding was several times repeated, and the warm bath was employed. This patient recovered.

3. In number 288 of the Medical and Physical Journal, Mr. B. Hutchison has detailed a case of tetanus occurring, without any ostensible cause, in a man long afflicted with epileptic fits. He was seized while a prisoner in the House of Correction, Nottinghamshire, with tetanus, and Mr. H. immediately abstracted 30 ounces of blood, and exhibited fifteen grains of calomel with two of opium. After this, a brisk purgative enema, containing an ounce of oil of turpentine, was thrown up, while a large blister was applied to the spine. The enema not producing any effect, half an ounce of the oil was administered by the mouth every two hours. Next morning the patient was free from every symptom of tetanus. He had taken two ounces of the turpentine, which had acted freely on the bowels.

4. The next contribution is from Dr. James O'Beirne, in the third volume of the Dublin Hospital Reports. This gentleman informs us, that out of about 200 cases of traumatic tetanus, which he witnessed in the Peninsular army, *not one recovered!* The antispasmodic treatment was more employed than the purgative—and he does not recollect that the spine was examined in any one case. Dr. B. was led to the employment of tobacco in this dire complaint principally from reflecting on the powerful influence which this medicine exerts on the nervous system. The earliest instance of its application to tetanus appears in Royston's History of Tobacco, in which it is stated that Dr. Gardiner published a little work on the efficacy of "Suffumigation of Tobacco in Tetanus," towards the beginning of the 17th century. Baron Larrey applied poultices of tobacco leaves to the wounds of soldiers in Egypt, when affected with tetanus; but without any decided effect. Mr. T. Duncan, of Grenada, relates a case of this disease, cured by tobacco-smoke. Dr. O'Beirne himself details an instance where complete trismus and slight opisthotonos had supervened in a healthy lad of 13 years, after some lacerated wounds of the feet. Other remedies failing to relieve the complaint, an enema of the infusion of tobacco (℈j. to the pint of water) was thrown up, and to be repeated twice a-day. The injection could not be forced up during the tetanic spasms, but only in the intervals. They caused nausea, vomiting, and copious perspiration, with tendency to deliquium. The symptoms were, at first, rather aggravated; but, in a day or two, the injections brought down some black, indurated fæces, and a dead lumbricus, a foot in length; after which the spasms were less frequent and the neck less rigid. The injections were continued, with

more or less regularity, for a fortnight or three weeks, generally with the effect of opening the bowels and relieving the tetanic spasms. The patient entirely recovered.

In the first volume of the Edinburgh Medico-Chirurgical Transactions, Dr. Anderson, of Trinidad, has published a paper on the same subject; and relates two cases, where fomentations of tobacco appeared to cure trismus in one patient, and "convulsive startings in the arm" in another. This remedy, Dr. A. informs us, is a popular one among the negroes of that island.

5. Mr. Carmichael has published, in the fourth volume of the Dublin Transactions, six cases of tetanus, with the results. Of these, only one case terminated favourably. This was a young man, 24 years of age, who was admitted into hospital on the 3d of August, 1822, with tetanic symptoms succeeding a contusion on the shin, and of four days' continuance before he came under treatment. He was bled to 20 ounces from the arm, and had a draught of castor oil, spirits of turpentine, and laudanum. He passed a tolerable night. Next day mercurial ointment was ordered to be rubbed in on the thighs every four hours, and tartar emetic ointment over the spine every night. In addition to these means, the vapour bath was employed, and 40 drops of laudanum were exhibited every three hours. On the next day but one the mouth was sore—the back covered with pustules. The tetanic symptoms were not increased. No material alteration took place during the three following days; but, on the fourth, he expressed a great desire for whiskey punch, which was allowed him pretty freely. From this time the tetanic symptoms declined, and he was discharged cured. This was evidently a mild case of the disease; and how far the remedies or Nature put an end to it, is not quite certain. Mr. Carmichael suggests the exhibition of alkohol, in considerable quantities, in this disease, keeping the bowels open with oil of turpentine and castor oil, while tartar-emetic ointment is to be rubbed over the abdomen.

6. Still more recently, viz. in 1825, Mr. Swan, surgeon to the Lincoln County Hospital, has drawn the attention of his brethren to the pathology of tetanus. In the year 1823, while making a complete dissection of a tetanic patient, he observed an unhealthy appearance of many of the ganglia of the great sympathetic nerves; but could not determine whether this phenomenon was connected with the tetanic symptoms, or caused by the remedies which had been employed—calomel, opium, and oil of turpentine. In the latter part of the same year, he dissected another person who had died of tetanus—and there, again, he found the ganglia of the great sympathetic exhibiting similar appearances. He now began to suspect that the altered state of the ganglia might stand in the relation of cause to the disease. About this time he learnt that Dr. Aronssohn, of Strasburgh, had observed similar phenomena, as also the younger Andral, who found great redness of the semilunar ganglia in a patient who laboured under fever, and

died with symptoms of tetanus. A case now occurred in the practice of Mr. Macauley, who permitted Mr. Swan to be present at the dissection, and they found appearances similar to those already mentioned. Mr. Abernethy, indeed, in his lectures, has thrown out hints or opinions, that the disordered state of the digestive organs, established during the irritative state of wounds, may be the occasion of tetanus when that irritative state has ceased. From experiments and observations, Mr. Swan has come to the conclusion, that the ganglia of the great sympathetic nerve become irritated after every accident in which the constitution sympathizes with the injured part—and that the parts supplied by them with nerves are, in consequence, disturbed.

Mr. Swan instituted a series of experiments on animals, with the view of illustrating this interesting point of pathology. They consisted chiefly in the production of constitutional irritation in wounded animals, by the introduction (into the wound, &c.) of irritating substances, as arsenic and gamboge. In almost all these experiments, the ganglia of the great sympathetic nerves were found inflamed. Mr. Swan does not, however, mean to assert that tetanus is a specific complaint, entirely seated in the ganglia of the great sympathetic nerves—but only that the ganglia are the important parts of the nervous system to which the first irritation tends, and from which it proceeds to the rest of the nervous system. I shall conclude with the following extract from his work, on the *methodus medendi* which he suggests.

" From the appearances on dissection of patients who have died of this complaint, I cannot help concluding, that there is a state of parts bordering on inflammation, and, therefore, that general bloodletting is indicated. Fever, and other decidedly inflammatory symptoms, may not generally, be present, yet they sometimes exist in a very great degree, as was most particularly exemplified in an interesting case* related by Mr. Earle.

" With a view of removing this congestion of the vessels of the medulla spinalis, blood should be taken from the back by leeches or cupping.

" The functions of the digestive organs are very frequently disordered, and as this state must aggravate all the other symptoms, every possible attempt should be made to restore them.

" I propose it as a question, Whether an emetic should not be given after general bloodletting has been employed, if the mouth be sufficiently open to allow of the ejection of the contents of the stomach?

" In the second case, the spasms ceased and never returned after vomiting took place. Nothing particular was ejected from the stomach, and, therefore, we cannot but suppose that the action of vomiting had a salutary effect on this organ; a circumstance very often witnessed, when every other medicine has failed to restore its disordered functions.

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* " Medico-Chirurgical Transactions, vol. iv. p. 93."

" After the emetic, or if this has not been used, the patient ought to be purged as soon as possible. A few doses of submuriate of mercury may be given, and any other strong purgative, until the bowels are freely emptied.

" In experiments on animals, I have found decided marks of inflammation of the ganglia of the grand sympathetic nerves produced by mercury. As there is a similar appearance of the ganglia in tetanus, I cannot help supposing, that the use of mercury is very doubtful, if not altogether hazardous; and so many cases on record, in which it has failed to restrain the disorder, show that it cannot by any means be depended on. I am willing to believe that practitioners may have thought it beneficial, because a patient who has used it has recovered. I have seen it administered in chronic tetanus, and the patient has got well; but the recovery was very slow; and whether it had any influence over the disease is most difficult to determine. These observations on mercury may well apply to constitutional irritation.

" When the patient has been well purged, it appears reasonable to suppose that quieting and relaxing medicines may be of use, as the pulvis ipecacuanhæ compositus given in frequent doses.

" Whether the meadow saffron would have any influence over tetanus, I cannot determine, but from the appearances on dissection, I do not despair of a discovery of some similar medicine, which has a powerful influence in allaying irritation of the nervous system, for the removal of this dangerous and painful disease." 96.

I shall only be able to glance at one or two more contributions respecting this dangerous disease.

In the Ed. Med. and Surg. Journal for October, 1825, Mr. Manifold and Dr. Briggs, of Liverpool, have published a case of tetanus cured by drastic purgatives, as calomel, oil of croton, scammony, &c. in very large doses, together with mercurial ptyalism. The patient was a youth of fifteen years of age, who had a compound fracture of the thumb, and was seized with tetanus after fatigue in walking. Smart doses of calomel were first administered—and afterwards quantities of calomel, scammony, gamboge, and other drastics, which would astonish a London routinist. During these exhibitions ptyalism came on, and the tetanic symptoms were much mitigated—the motions became more copious and feculent, and the patient ultimately recovered. I forgot to mention that tobacco-glysters had been used, and a large blister applied to the spine.

I shall notice but one more case of traumatic tetanus, successfully treated by Dr. Reese, of Baltimore. The patient was a young lad who had received a quantity of buck-shot in his back from a gun. Two of the shot entered the spine, and this was followed by total paralysis of the parts below. In seven days, symptoms of tetanus supervened, in the form of opisthotonos, which threatened the life of the patient. A drachm of lauda-

num was exhibited every half-hour during the first night—and the next day it was determined to try the effect of an extensive application of caustic potash along the whole course of the spine. In four hours after this application, there was a mitigation of the tetanic symptoms, and the patient fell into a sleep which lasted six hours. He awoke free from spasms. The boy recovered.

I have now put my readers in possession of all the most recent opinions and practices regarding this formidable disease, and they must choose for themselves. All that is known with any degree of certainty, in regard to the pathology of tetanus, corroborates the idea, that an irritation or inflammation attacks the *spinal marrow* (for the sensorial functions are rarely disturbed), whatever may be the *primary* source whence this irritation or inflammation proceeds. It may arise from a wound, or from irritation in the primæ viæ—but I conceive that the spinal marrow must be affected before the tetanic phenomena can take place. While, therefore, we are to endeavour to remove the original *cause*, we must here, as in many other diseases, direct our attention also to the *effects*—or, at least, to that part which is immediately connected with the production of these effects. There are many links in the chain of causation, in general; and it will not always be sufficient to strike through the *first* link:—We must endeavour to sever that, also, which is nearest to the disease.

OBSERVATIONS

ON THE

DISEASES AND REGIMEN

OF

INVALIDS

ON THEIR RETURN FROM

HOT AND UNHEALTHY CLIMATES.

The English youth leaves his native shores, with vigorous health and buoyant spirits, for a foreign land of promise, where he is to meet with adventures, acquire fame, and realize a fortune. All the happy events (real or ideal) of his future journey through life, are painted by his ardent imagination in prominent characters, on the foreground of the scene; while reverses, sickness, disappointments—death itself, are all thrown into the shade, or, if suffered to intrude, only serve as incentives to the pursuit which has been commenced.

During the short span of existence to which man is doomed on earth, it is a merciful dispensation that youth anticipates no misfortune—and that, when the evil day arrives in after-life, Hope comes, on glittering wing, and gilds the scene even till the last ray of our setting sun is extinguished!

I have already portrayed, in another place, the dangers which the tropical sojourner runs, the diseases to which he is subject, the remedies which experience has found most effectual, and the regimen which appears to me most appropriate in the Torrid Zone.* A task remains, which I did not originally undertake, but which the experience and observation of forty years now enables me to accomplish. The nature of that task is explained in the title of this part of my work.

An epoch sooner or later arrives, when the completion of a period of service—the acquisition of competent fortune—or, what is more frequent than any other, the loss of health, points to a return to our native land—a land which the more constantly engrosses our daily thoughts and nightly

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* Influence of Tropical Climates on European Constitutions, 6th Edition.

dreams, the farther we are distant, and the longer we are absent from it. None but those who have sojourned for years on foreign shores, can appreciate the feelings of the European, who wastes the prime of life beneath a tropical sun, languishing in body, and pining in thought to revisit the scenes of his youth. If he crossed the seas in early life, full of anticipations that could, alas! be but rarely realized—he shapes his course back again across the same pathless deep, with chastened but scarcely less ardent hopes of health and happiness, on the soil which gave him birth.—Here, too, he is destined to encounter dangers as well as disappointments. The powers of the constitution, however plastic, cannot immediately accommodate themselves to great and sudden changes of climate, even when the transition is from a bad to a good one; and the tropical invalid requires full as much caution and prudence in approaching the shores of England, as he did in landing, at the former period, on the banks of the Ganges.

When the European has become much debilitated by liver affection, dysentery, or fever and its consequences, his main hope of recovery rests on change of climate; and, under such circumstances, the sea-voyage will often effect a cure. Indeed, the instances are not few where more benefit is obtained by the voyage home, than by subsequent residence in England. The voyage, though not totally free from inconvenience, presents not the thousand temptations to deviate from regular habits and regimen, which afterwards assail the tropical invalid, when he mingles with society in his native country. Besides, the uniformity and salubrity of the sea air, aided by the mental exhilaration of a *homeward* voyage, produce surprising effects on the animal economy. During this voyage the effects or sequelæ of fevers generally disappear, and both appetite and strength return. But chronic dysentery and hepatitis are not so easily removed, and these the tropical invalid most commonly brings with him to Europe—sometimes considerably mitigated, but at others, rather exasperated, especially if stormy wet weather is experienced off the Cape, or if the ship arrives in the Channel at an unfavourable period of the year. By residence in a hot climate, the constitution becomes assimilated to it, and, in some measure, changed—the return, therefore, to a cold, though more healthy latitude, is liable to produce, if great care be not taken, a determination to those organs which have been weakened by previous disease, and thus a more or less acute or subacute inflammation is often set up in the mucous membrane of the bowels—or they are rendered more irritable than before the invalid left India. A subacute inflammation of the liver is sometimes thus superinduced on a chronic disease or a torpid state of that organ, requiring not only the subduction of the stimulus of food and drink, but even local abstractions of blood from the region of the liver.

But the most serious consequence of a return to Europe, after long residence in a tropical climate, is the aggravation or even production of disease

in the chest. The mucous membrane of the lungs sympathises readily with that of the stomach, and thus is produced what is called a stomach cough. Chronic disease of the liver produces the same thing, whether by means of sympathy, or simply by contiguity with the diaphragm, which is so intimately connected with the organ of respiration. Now, in a great majority of instances, these affections of the chest are only *symptomatic*, even when the invalid has returned to Europe, and will subside in proportion as the functions of the stomach and of the liver are restored.* But on the other hand, there are many cases where the *symptomatic* affection of the chest has continued so long as to induce *actual* disease there—which disease will not be removed, nor even materially relieved by the remedies prescribed for the liver or stomach complaint.

In this country, the symptomatic affection of the lungs, in chronic hepatitis and indigestion, has excited much attention, and has been treated of under the names of "hepatic phthisis," "dyspeptic phthisis," and "stomach cough." Where there is evidently derangement of the liver or stomach, and the patient is lately from a hot climate, the English practitioner sets down any pulmonary affection that may be complained of, as symptomatic, of course, of the abdominal disorder—and thus, that time is lost in abortive attempts to remove both classes of complaints by striking at the original one, which might have saved the lungs from irremediable disorganization. Many are the instances I have seen, and continue to see, where patients have been pronounced to be labouring under *symptomatic* disease only, while a few minutes' examination of the chest, by percussion and auscultation, detected organic changes in the lungs or heart, which had passed the period when any chance of recovery could be expected. This, in fact, is one of the greatest dangers which the tropical invalid runs, when he embarks for his native climate, where pulmonary complaints are the prevailing diseases. On this account, he should, from the moment he goes on ship-board, pay the utmost attention to his dress, and most cautiously avoid all exposure to wet and cold on the voyage homewards. This caution is not less necessary for the invalid affected with the usual consequences of tropical diseases only, and where the chest is free at the time he embarks. As he approaches the Cape, and afterwards the Channel, he is much more liable to pulmonary affection than a person who has never suffered from hepatic or stomach disorder; and, if the chest once becomes affected, he is much more exposed to fixed and dangerous disease there. If the pulmonary affection, even of the mildest kind, and purely symptomatic, has manifested itself between the tropics, he is in still more danger—and if the English practitioner fails to make the most rigid examination of the chest,

* In tropical climates, pulmonary consumption is comparatively a rare disease; but in the hotter countries of Europe, as the South of France, Italy, &c. I believe that this dreadful scourge is little less frequent than in England.

on his arrival, he becomes morally responsible for all the serious consequences which may subsequently result from this neglect. In short, I have no hesitation in asserting, that the disorder of the chest, even if purely symptomatic, demands more attention, and is really of more importance than the abdominal disorder from which it arose. There is little or no *organic* disease of the *liver* in nineteen cases out of twenty of those who return to this country labouring under what is called "liver complaint,"—and this remark is still more applicable to the *stomach*—consequently, there is but little risk of life. But if the *lungs* once become affected in structure—if *symptomatic* be confounded with *organic* derangement, or suffered by neglect to pass into that state, the case will rarely be otherwise than fatal. This case is quite different from that of the liver; for if symptomatic affection of the chest be confounded with incipient organic disease, the remedies for the one will be of no use whatever in the other.

The surgeon of the ship, therefore, should take an early opportunity of examining all invalids complaining of cough, or who are easily put out of breath on ascending ladders or stairs. If they cannot lie low in bed, or take in a deep inspiration without exciting cough—and still more if they feel uneasiness in any part of the chest, the case should be immediately attended to before the patient gets into the high latitudes, where the malady will certainly be increased. A blister—a few leeches—or a crop of pustules excited by tartar-emetic, aided by warm dress, abstinence from stimulating drink, and some gentle diaphoretic to act on the skin, would save many a day's sufferings afterwards—nay, many a valuable life. But of this more hereafter.

It is on the voyage to England where there are many circumstances favourable to the object in view, that the invalid should seriously think of adopting a system of diet and regimen that might not only obviate any injurious effects of a sudden transition from a hot to a cold climate, but contribute materially to the removal of those complaints contracted by residence in the former. It cannot, indeed, be too strongly impressed on the mind of the tropical invalid, that without a firm resolution to coerce his appetites into complete subjection, and make them subservient to the restoration of his health, he will gain little by a return to his native skies; but, on the contrary, he will either confirm those maladies under which he already labours, or, what perhaps is worse, convert them into forms, less formidable indeed in appearance, but effectually subversive of every enjoyment, mental or corporeal, which can render life desirable. Of all the miseries to which man is liable, by the frailties of his nature, there is none more terrible to endure, or difficult to remove, than that HYPOCHONDRIACAL DESPONDENCY which is sure to settle on the tropical invalid, in his own country, in the midst of his friends, and in the possession of wealth, unless he succeeds by timely and proper measures, in correcting those morbid conditions of the digestive organs, from which this DÆMON draws a gigan-

tic power and influence, that tyrannize over all fortitude, philosophy—and often over religion itself! The extent of this evil is so great in these Isles, that it has been suspected, and not without probability, that our tropical colonization has introduced and propagated, by hereditary descent, a strong disposition to stomach and liver affections beyond that which is observed in any other country. Be this as it may, the instances of insanity and suicide, from this cause, are not exceedingly rare; while the number of hypochondriacs, cursed, I might almost say, in the possession of reason and wealth, but driven to despair by the torture of their own morbid feelings and nervous irritation, which may be seen in all parts of the British dominions, but especially at watering-places, is truly astonishing! Of these, our tropical invalids form no inconsiderable portion; and although the wretchedness of their sensations is only known to themselves, their medical attendants, and some of their intimate acquaintances, the amount of it is great beyond all calculation.

That this unhappy winding up of a life spent under a burning sun, in the acquisition of wealth, and in the vain expectation of enjoyment in declining years, cannot always be prevented, is but too true; yet, at the same time, I know from repeated examples and multiplied observation, that a rigid system of self-control, adopted as soon as the individual withdraws himself from the deleterious influence of a hot climate, and persisted in for a certain time after his arrival in Europe, would, in nine cases out of ten, be followed, not only by restoration of health, but by an equilibrium of spirits and mental serenity, which none but the temperate, the abstemious, and the prudent, can possibly appreciate. This system has already been detailed in the first part of the work.

The principal states of indisposition under which an invalid embarks for Europe, are debility from long-continued disease of the liver, or from the remedies unavoidably employed for that complaint—debility from fever, or from a continuance of regular or irregular paroxysms of the disease—and bowel-complaints.

Debility can only be removed, of course, by the introduction of nutriment into the *system*—but this does not always follow the introduction of food into the *stomach*, even when taken with considerable relish. One of the first effects of the sea air is an increase of appetite, and the invalid hails this as a favourable omen, and indulges the propensity to eat. The debility of the various organs, however, and their previous desuetude to much nourishment, seldom permit this new propensity to be satisfied, without subsequent detriment. Indigestion, feverishness, or irritation of the bowels is apt to follow too free an indulgence of the appetite, and consequently there is no increase of strength from this temporary return of desire for food. *Appetite*, indeed, is a doubtful criterion for taking food—*digestion*—easy digestion, is the only sure guide. If we feel uneasy after *four* ounces of food, but comfortable after the injestion of *two* ounces, we

shall derive more support from the latter than from the former. The quantity and the quality of the food must be both carefully regulated—and, in general, the invalid's own feelings will warn him when he has erred on either point. But this is not always the case. There is no effect of indigestion more common than *dejection of mind*, when no corporeal inconvenience appears to follow. The nerves of the stomach and upper bowels will be irritated, and this irritation will be propagated to the whole nervous system, and to all its moral and intellectual attributes, by quantities and qualities of food which excite no sensible uneasiness in the organs of digestion, and produce no change in the secretions or excretions by which the evil might be detected. A want of attention to this circumstance—or rather a want of knowledge of it, has led, and leads daily, in numerous instances, to states of mental despondency, ending ultimately in complete hypochondriacism. In insanity, the morbid condition of the *mind* is *invariably* dependent on a morbid condition of the *body* (whether induced by moral or physical causes), although the *latter* is rarely cognizable by external corporeal symptoms. This holds equally good in hypochondriacism. The mental despondency is *invariably* dependent on some disorder of the body, and, in a majority of cases, it is immediately dependent on a morbid or irritable state of the nerves of the stomach and bowels. Of the truth of this I have had such multiplied proofs, that not a doubt remains on my own mind respecting it. It is as useless to attempt the removal of this mental despondency by moral means or mere persuasion, as to try to remove a fever or an inflammation by argument. The attempt, indeed, betrays a great ignorance of the real nature of the complaint in the physician. Moral means may certainly contribute to improvement of the general health, and this will much improve the state of the digestive organs, on which the mental despondency depends. It is only in this way that moral means can have any influence on hypochondriacism. But of this, enough has been said in the first part of the work.

If the invalid only labours under that debility produced by fever and the remedies used for it, the sea air and the gradual increase of tone in the digestive organs will generally be sufficient to renew the strength, under the caution above-mentioned respecting diet. In such cases it can rarely be prudent to exhibit direct tonics at the beginning of the voyage. A warm bitter is quite sufficient, as equal parts of infusion of ginger and gentian, with four or five grains of carbonate of soda, and a drachm or two of any bitter tincture in each dose. The bowels should be regulated by mild aperients that do not produce thin or watery discharges—an operation which should be avoided, but which, I am sorry to say, continues to do infinite mischief. Many practitioners and patients are absolutely infatuated with the benefit to be derived from the blue-pill at night, and the black dose in the morning. This medicine certainly sweeps away abun-

dance of thin, fetid, slimy, and unhealthy secretions, and the patient feels lighter and more comfortable for a time; but a repetition of the practice produces the very secretions which it is designed to carry off or prevent. After clearing the bowels in this way, the great object is to procure *formed* motions, if possible, and that not oftener than once in the twenty-four hours. That medicine which goes slowly and without irritation along the intestinal canal, permitting the nutriment to be taken up by the absorbents, and gently stimulating the large intestines to discharge the useless residue, is the one to which we should have recourse. Aloes is the basis of such medicine; but as, in the class of patients now under consideration, there is generally a defective or vitiated condition of the biliary secretion, and an irritable state of the gastric and intestinal nerves, together with a torpid skin, it is necessary to combine other medicines with the aloes. A grain of blue-pill, two or three grains of extract of hyosciamus, and a quarter of a grain of ipecacuan, combined with as much aloes, or extract of colocynth, as is sufficient to move the bowels once daily, will be found a valuable form of aperient for the invalid on the voyage home. The hyosciamus allays the morbid irritability of the nerves of the digestive tube—the blue-pill gently excites the hepatic secretion as well as the pancreatic and gastric—the ipecacuan acts mildly on the skin—while the aloes or colocynth carries the whole slowly along the canal, and finally expels the fæcal remains in the course of the ensuing day. Some little time may be necessary to ascertain the proportions of these medicines that may suit individual cases—but there can be little difficulty in obtaining the proper result in the end. It is supposed that a disposition to hæmorrhoids is an insuperable objection to aloes, or the compound extract of colocynth. This has been proved to be an error, and aloes is now commonly given by some of the best London practitioners for hæmorrhoids. It is *too much purging*, that increases and irritates piles rather than the *kind of purgative*. Where it is desirable to procure one free and copious operation in the morning, a common Seidlitz powder taken at 7 o'clock, and before breakfast, will pretty certainly have this effect.

If the tropical invalid continues to be teazed with regular or irregular paroxysms of fever, in spite of the above means, the sea air, and strict regimen; then we must have recourse to certain specifics—and above all to the sulphate of quinine, a medicine which is, indeed, of singular efficacy, when properly managed, in many of those morbid conditions of the digestive organs resulting from the influence of tropical climates. The doses, however, should be small in the cases now under consideration, where there is generally some obstruction or congestion in the liver or spleen. The surgeon should attentively examine the state of these viscera, and, by local detractions of blood and counter-irritation, remove or lessen those affections on which the returns of the febrile paroxysm depend. When these organs are secured by such means, then from one to three grains of the quinine

should be given every six hours, during the intermission, in an infusion of bark, quassia, or gentian—and neither the surgeon nor patient should be over-anxious to stop at once these paroxysms by larger doses of the medicine. It is far better gradually to give tone to the whole digestive apparatus, while the secretions of the glandular viscera are slowly improved by the mild aperient above-mentioned. The attacks, at first mitigated, and ultimately stopped, in this slow manner, will be far less liable to recur, than when overwhelmed suddenly by such powerful tonics as the quinine and arsenic in large doses. The invalid, however, ought to continue the use of quinine, in conjunction with bitters and aperients, for a considerable time after all periodical accessions have ceased, since changes of weather, irregularities in diet, and many other causes, are very apt to reproduce the paroxysms.

Although the subject of diet has been particularly considered in my work on Indigestion, yet it may not be improper to glance at it in this place, as connected with the tropical invalid. A ship cannot be supposed the best place for adopting a systematic course of diet, but as, from the Pharmacopœia, we select a very small number of medicines for practical use, so, from the interminable list of culinary substances, a very few indeed will suffice for the *necessary nutriment* of man, especially when he is in a valetudinary state. In health, we may pamper the senses—as invalids, we must consult the *sensibility* and capability of the stomach and bowels, without any reference to the palate. If we do not, we pay the penalty most severely.

The tropical invalid, then, returning for debility, resulting from liver-complaint, long courses of mercury, or protracted fevers of whatever type, should breakfast on ship-biscuit or stale bread toasted (with very little butter), and black tea, coffee, or chocolate, with very little milk and sugar. A slice of cold meat is better than butter for breakfast. As dinner is at an early hour, he should rarely give the stomach any more to do till that period. He should then dine on *from one to six or eight ounces* of plain animal food, according to his digestive powers, without vegetables of any description, unless stale bread or ship-biscuit be classed under that head. This will seem a most terrible rule! It is so in appearance, after the luxuries and provocatives of an oriental table. But let the invalid pursue it only till he passes the Cape of Good Hope, and then he has permission to change it, and adopt what system he pleases. If he will not adopt so rigid an abstinence from vegetable matter at dinner, the best thing, next to biscuit or stale bread, is well-boiled rice—rice or bread-pudding—or a dry, mealy yam. In England, a mealy potatoe may be tried, but even this is apt to irritate the disordered nerves of a dyspeptic invalid.

In respect to drink, a table-spoonful or two of good brandy to two wine-glassfuls of water, is a mixture preferable to wine of every kind. Sherry is the next best drink, not exceeding two or three glasses. If a

sense of thirst prevail, while masticating *well and slowly* his food, he must take some of his drink—if not, let him finish before he drinks. The above potation should be made to suffice, if possible—and double the quantity should hardly ever be exceeded. It will be said that constitutions differ, and that what will agree with one stomach will not agree with another. This may be true ; but we cannot make rules for exceptions. There will not be one individual in fifty with whom the above plan will be found to *disagree*. We know, indeed, that some people will rather indulge the senses than improve the health—and these will aver that such a rigid system of diet entirely disagrees with them. They have truth laid before them here ; they may adopt it or neglect it, as they think proper. The penalty will fall on themselves, not on the prescriber. It is hardly necessary to say, that no other dessert than biscuit is at all to be ventured on.

Tea or coffee, with biscuit, or dry toast, at 6 o'clock—and half a pint of good gruel, sago, or arrow-root, with a table-spoonful of brandy, for supper, should close the day, at ten o'clock in the evening. The invalid should then go to bed—and if he has been accustomed to more stimulation than the above scale affords, he will pass some sleepless nights, and be often tempted to break the vile system of abstemiousness which the doctor has prescribed. Let him persevere. Sleep will come, and that, too, of a more refreshing quality than ever followed the stupefying influence of wine or spirits. We daily hear it remarked, that long-established habits of intemperance cannot be safely interrupted at once. Of the truth of this I have much doubt, because I have seen a few—alas ! a *very few* instances, where downright habitual intoxication was suddenly checked, without any bad consequence resulting. But this is not the point under consideration. I am speaking of habits which are looked upon as within the limits of temperance—for instance, the habit of drinking a pint of wine after dinner—and a glass or two of brandy and water in the evening, while smoking a cigar. This habit may be easily broken, or at least diminished, and what is of still more consequence, the habit of *eating a great deal too much* through the day, may be readily and beneficially changed into abstemiousness. This is of still more consequence than the drink.*

Bowel-complaint is one of the most common diseases under which an invalid labours when embarking for Europe. It is one, too, which is seldom cured on the voyage home. After repeated attacks of dysentery or hepatitis, the mucous membrane of the colon and rectum is actually altered in structure, while that of the small intestines continues highly irritable for a long time. A large quantity of mucus and of very morbid secretions is constantly poured out from these surfaces, and their irritability

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* Let it be always remembered that I am speaking of invalids, and not of people in health, who, where air and exercise are taken, may indulge, in food and drink, to an extent which cannot be borne by those enfeebled by disease.

will not permit the presence of food or fæces, as in a healthy condition of the alimentary canal. In those who die of dysentery, we find ulcerations in the colon and rectum, with thickening and other lesions of the coats of these tubes. In those, therefore, who have presented the same *symptoms*, but who have been fortunate enough to survive, there is every reason to believe, nay, there are positive proofs that ulcerations had existed, or do exist, as, indeed, has been proved by dissection, when death has unexpectedly taken place from other diseases. Ulceration of the intestines may obtain without any discharge from the bowels, or particular pain that would indicate such a serious malady, as is proved by finding extensive ulcers in the mucous membrane, where death has been occasioned by fever—and that, too, without any tenderness on pressure of the belly being evinced during life. Where there is discharge of mucus, blood, and puriform fluid, we may pretty certainly prognosticate that there is ulceration or other organic change in the coats of the lower bowels. This state will, of itself, keep up chronic diarrhœa or dysentery, till the parts are restored to a sound condition—and, even after the structure becomes sound, the function, from long habit, will remain deranged, or easily rendered so by very slight causes.

But another, and still more fertile source of chronic bowel-complaint is disordered function, or diseased structure of the liver—one very common effect of which, is relaxation and irritability of the bowels, especially in a tropical climate, and for some time after returning to Europe. It is not necessary, in this place, to enquire into the reason why the function of the bowels should be so generally disturbed by disorder of the liver. The fact is well known to all who have practised in tropical climates, and that is sufficient for the purpose, at present.

If the bowel-complaint be unaccompanied by hepatic affection, and merely kept up by disease or disorder in the bowels themselves, the treatment is less complicated, both on the passage home, and subsequently in Europe, than where chronic hepatitis is present.

In the former case, or simple bowel-complaint, the invalid has three-fourths of the treatment in his own hands, or in his own power. Have we any certain remedy to cure a chronic inflammation, or ulceration of the internal surface of the bowels? I doubt it. Nature must be the principal physician. But we can withdraw those things which obstruct nature and keep up the disease. If any portion of external surface were in the above-mentioned condition, what would we do? The answer is plain, We would protect the part from extraneous irritation, and give it rest. Nature would do the remainder. This rule is equally applicable to bowel-complaints. The passage of the remains of our food over the irritable or diseased membrane lining the bowels, causes pain, throws the intestines into increased action, and, in fact, produces the phenomena of chronic dysentery or diarrhœa. We cannot, it is true, prevent this entirely; but we can live

upon that kind of food which affords not only the least *quantity* of residue, but the least irritating *kind* of residue. This object is obtained by living as much as possible on farinaceous food, as sago, arrow-root, gruel, tapioca, rice, panada, with animal jellies. It is evident that every thing that passes the stomach undigested must add to the complaint, and, therefore, the quantity of nourishment taken in should always be as small as is compatible with the support of life. Indeed, as was observed before, the less that is taken into the stomach, comparatively speaking, the more will be extracted from it by the digestive apparatus, and the more strength we will derive from it. As the organs of digestion are, in this complaint, greatly weakened, those substances which have any tendency to turn acid are particularly injurious and irritating, since the vital powers of the stomach and intestines are not sufficient to over-rule the chemical laws that produce the fermentative process. Hence vegetables and fruit are poison to the dysenteric invalid. The drink is also a matter of great importance. Wine is generally injurious, and very weak brandy and water is the only stimulating potation that can be safely indulged in. Rice water, with some spice and a little brandy, is the best drink—and as little fluid of any kind as possible should be taken into the stomach.

There is one important item in the management of bowel-complaints which is too often overlooked. This is, the necessity of *quietude*. It is difficult to account for the circumstance, but it is an absolute fact, that *rest* and the *horizontal posture* are of more benefit in dysenteric affections, whether acute or chronic, than in many of those spinal diseases for which the patient is confined to a hard mattress or an inclined plane. The action of the abdominal and other muscles sets in motion and augments the peristaltic action of the intestines, already in excess, and thus hurries along the remains of food, and produces many more evacuations than would otherwise take place in a state of quietude. The tropical invalid, therefore, should not be gadding too much about the decks on the voyage home, but confine himself a good deal to his cot or his cabin; and in wet or blowing weather he should not attempt to go from below, unless compelled by unavoidable circumstances. It has been objected to this, by a respectable Reviewer, that the caution above-mentioned subjects the invalid to the impure air of the between-decks of a ship. There is little or no impure air in the cabins of Indiamen; and at all events, this inconvenience is not to be compared to the exasperation of a bowel-complaint, by exposure to wet and cold on the open deck.

As the temperature of the ocean is, at all times, much below that of the land in the hot season, the invalid should guard the skin most scrupulously from all assaults of moisture or cold air. If this be not attended to, the bowel-complaint will be exasperated instead of amended on the homeward voyage. The belly should be bandaged pretty tightly with a very long flannel roller, which will prove not only a defence from cold and

humidity, but it will curb the action of the abdominal muscles, and tend to keep the intestines quieter. Food and drink should not be taken either very hot or very cold. The *former* excites the bowels almost immediately —and the *latter* causes pain in the stomach and colic in the intestines.

But is there nothing to be done in the way of medicine? Yes, provided the medicinal treatment be aided by the strictest attention to diet and regimen, as sketched out here. We cannot by direct remedies heal chronic ulcerations, or remove thickenings, or other morbid affections of the intestines—but we can greatly assist Nature in preventing and removing various sources of irritation; and we can lessen the morbid sensibility or irritability of the bowels themselves, and thus check the increased discharges from them.

The two principal sources of irritation are, the remains of food passing along an irritable or actually diseased surface—and acrid or morbid secretions, coming from the liver, the pancreas, and the glands and follicles of the intestines themselves. I have already hinted at the means of lessening the irritation of fæcal matters, by strict attention to the quantity and quality of food taken into the stomach. If this point be attended to, much of the inconvenience from morbid secretions will be prevented; for there is not a more certain method of rendering the secretions acrid and diseased, than by eating and drinking more in *quantity* than can be well digested and disposed of—or things of a *quality* known to disagree with irritable bowels.

For the improvement of the biliary secretion, much may be done by medicinal treatment. As there is generally some degree of low inflammation or congestion about the liver, a few ounces of blood taken from the neighbourhood of that organ, once in a fortnight or three weeks, will be of essential benefit—especially if there be pain or tenderness on pressure under the false ribs. The counter-irritation of an occasional blister, or, what is better, a tartar-emetic plaster to the region of the liver, will be found a useful item in the treatment. Very minute doses of the mildest mercurial, particularly the hydrargyrum cum creta, or the blue-pill, combined with a small quantity of ipecacuan, and a drop or two of essential oil, every night, will be necessary, even if long and repeated courses of mercury have been previously endured. For it is to be recollected, that the same remedy which fails, or only partially succeeds in tropical climates, where the causes of hepatic derangement are in constant operation, will be often successful when the individual is withdrawn from the sphere of these causes, and enjoys the pure air of the ocean, or the genial influence of his native skies. But a mild mercurial is necessary, as an alterative, and to keep up some degree of healthy action, in an organ that has been long stimulated by the heat of India, and by large doses of the same medicine, unavoidably exhibited to prevent destruction of the biliary apparatus.

As *acidity* is a common symptom in chronic bowel-complaints, so alkaline and absorbent medicines are daily and almost hourly necessary, till the digestive organs have acquired more power over the food taken in. Three to five grains of the carbonate of soda, with an equal quantity of the compound cinnamon powder, three or four times a day, will be a useful antacid, and will cut off one source of irritation.

On the other hand, *rancidity* is apt to prevail where oily or fat substances are taken into the stomach. We cannot qualify this so readily as acidity. Indeed, I have shewn in another place, that this rancidity is, sometimes at least, accompanied by an acrimonious *alkali*, and requires acids for its removal. We should avoid the cause. A bitter spirituous tincture is the best thing to check rancidity when it has taken place.

Acrid, acid, and rancid matters, however, are so quickly and so constantly generated in the bowels, that we are forced to expel them by aperient medicines, even at a time when the intestines are really too often acted on. The relief that follows this forcible expulsion of morbid secretions has induced both patients and practitioners to have too much recourse to purgatives, both in acute and chronic bowel complaints. These give relief in two ways—by removing irritating matters, and by lessening, for a time, irritability itself. Any strongly acting purgative will, as it were, exhaust the irritability of the nerves of the mucous membrane, and a temporary insusceptibility to the impressions is the natural consequence. But this method should be cautiously employed, and other means are preferable. Castor oil, rhubarb, magnesia, and the milder aperients, not too often repeated, are much better than doses of calomel and black-draught, whatever may be the degree of comfort experienced after these last medicines. Thin injections of gruel and oil, with some laudanum, are very useful, not only by allaying irritability of the rectum and colon, but by washing away the remains of irritating secretions from these parts. Whenever we exhibit purgatives in this complaint, we should combine with them some slight anodyne—especially the extract of hyosciamus or lettuce. This is a precaution too little attended to in practice.

So much for the correction of irritation resulting from diseased secretions. But we must remember that there is a morbid *irritability* of the mucous surfaces of the stomach, and especially of the bowels, in consequence of which, things that, in health, would produce no sensation, much less inconvenience, cannot now be borne without great discomfort. This state often obtains where no inflammation, no ulceration, no organic or perceptible change of structure in the parts themselves, has yet taken place, or remains after having once existed. Such condition appertains to the nerves of the digestive organs, and can only be remedied through the nervous system. There are many ways of diminishing *morbid* nervous irritability—I say *morbid*, because those things which decrease *morbid* irritability or

sensibility, will not always decrease natural or healthy irritability. I have remarked on one of the classes of means we are to use—the subduction of irritating food, and the correction or removal of irritating secretions. The direct reduction of morbid sensibility in the intestines is generally attempted by direct sedatives or anodynes—of which opium stands at the head. Without this valuable medicine, we can seldom succeed in the bowel-complaints of hot climates; but its use is attended with much inconvenience in many constitutions, and we should endeavour to make as little as possible serve the purpose of quieting the bowels, and lulling the sensibilities of their nerves. From half a grain to a grain of opium, combined with two or three of hyosciamus, a grain of blue-pill, and half a grain of ipecacuan, will be found very beneficial every night at bed-time, continued for a considerable time, while, every second or third day, a small dose of castor oil may be advantageously taken to remove any hardened fæces or diseased secretions from the cells of the colon, in which they occasionally lurk, and keep up irritation in the whole line of the bowels. Where castor oil cannot be taken, rhubarb and magnesia are the best substitutes.

When the invalid is harassed through the day with frequent motions, consisting principally of slimy mucus, and attended with straining and tenesmus, he should keep as quiet and horizontal as possible, and take a spoonful of the following medicine after every relaxed motion.

℞. Mist. Cretæ ..... ℥iv.
Confect. Aromat. ..... ʒij.
Tinct. Rhei .....
—— Card. comp. āā ʒij.
Liq. Opii Sed. ..... ʒj.
Syr. Zingib. ..... ʒiij.

Misce, fiat mistura, capiat. coch. j. mag. post singulam sedem liquidam.

If the opium disagree, the tincture of hyosciamus may be substituted; but it is not so efficacious in restraining the discharges from the bowels.

There are many other medicinal substances which lessen morbid sensibility of the bowels besides those of the anodyne or narcotic class. It has long been known that *debility* is the parent of *irritability*. This is obvious to the most superficial observers. A familiar example is seen after all acute or inflammatory disease. During the height of the fever or inflammation, for instance, the general excitement of the system prevents the feeling of weakness—but as soon as the excitement subsides, the patient is then sensible of his exhaustion, and becomes proverbially irritable. Nurses and other attendants on the sick are aware that this irritability is a sign that the disease is subsiding or subsided, and always consider it as a favourable symptom. Now what applies to the whole applies also to a part. Wherever local disease has been established, and the structure or functions injured, *there* will be debility and irritability. By removing the *former*, we shall

generally mitigate the *latter*. Tonics, therefore, when they can be borne, and where they do not induce too much excitement, are valuable means of blunting the morbid sensibility of the nerves. But their bulk often proves a source of irritation to the stomach and bowels, hence the sulphate of quinine, properly managed, is superior to most others, on account of its vast efficacy in so small a form. It is generally given in doses too large, by which an excitement is produced that renders it necessary to discontinue the medicine. The following form will be found a convenient mode of administering this remedy in chronic dysentery and diarrhœa.

℞. Tinct. Gentianæ comp. ..... ℥iss.
—— Zingiberis ..... ʒi.
—— Camphoræ comp. ..... ʒij.
Sulphatis Quininæ ..... gr. xij.
ft. solutio, capiat coch. j. minut. ter die, ex pauxillo aquæ tostæ.

The principal inconvenience that I have found to follow from this remedy, is the increase of appetite which generally succeeds, and which may induce the patient to indulge too freely in food. He ought to be put on his guard against this danger. The improvement of digestion that results from the operation of this medicine on the stomach will greatly conduce to the removal of irritation from the bowels, of which imperfectly-digested food is a common source. Independent of this, the quinine will be found, thus managed, to give tone to the whole line of the mucous membrane—to restrain the mucous discharges—and thus to directly lessen morbid sensibility in the nerves of these parts.

I am not partial to common astringents in the bowel complaints which follow diseases and residence in hot climates. The mucous discharge is thus too suddenly stopped, and a sub-acute inflammation of the membrane from whence it issued, or of the liver itself, is not unusually set up in consequence. It is far better to withdraw irritation and reduce morbid sensibility—the *causes* of the increased discharges, than to strike at the branches while the root remains untouched. The various astringent substances that have been employed to restrain dysenteric and hepatic flux, are worse than useless; and the practice of applying them is built on an erroneous foundation.*

If the means which I have pointed out should fail, it is highly probable that a gentle mercurial course will be necessary, either on the voyage home, or soon after gaining the shores of Europe. This course, as I have hinted

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* Within these two or three years, I have seen some extraordinary good effects, in chronic irritability of the bowels, from small doses of the nitrate of silver taken internally—namely, half a grain to a grain twice a day. We know the efficacy of this application externally, in lessening the irritability of sores; and I conceive that it acts in the same manner internally. See my Treatise on Indigestion, 10th Edition.

before, will often effect a cure, where long and repeated courses of mercury, beneath a tropical sun, and in a land that produces the causes of the disease, may fail, or give only temporary relief. The mouth, however, should not be made sore while rounding the Cape, especially if that part of the voyage be made in June, July, or August, when wet and cold weather may be expected. Advantage should be taken of the milder and lower latitudes, near the Equator, if it be deemed indispensable to impregnate the system with mercury.

But, however this may be, as the tropical invalid approaches the shores of England, he should protect the skin, by all possible care, from chills or damp. The atmospheric influence will reach him, in spite of all precautions; but if he rashly exposes himself to the skies of this country, after a long residence in the torrid zone, especially if labouring under bowel or pulmonic complaint, he will be in danger of serious aggravation of his malady. Flannel and chamois-leather should be worn by the tropical invalid.

Before quitting the subject of the homeward-bound voyage, I cannot help saying a few words more on a topic which has been already touched on—namely, those affections of the chest which are originally induced by disease of the liver, or of the digestive organs generally, and which have been called, "dyspeptic phthisis," "stomach cough," &c. Many valuable lives are annually lost by treating these complaints as purely symptomatic, when they have actually become fixed diseases in the lungs or other parts within the chest. When the disorder has passed the boundary, and become independent of its original cause, which it not unfrequently does, then I maintain, from the most unquestionable evidence, that it is aggravated rather than alleviated by the remedies employed for the cure of the original complaint. Modern investigations (auscultation and percussion) have now given us the means of ascertaining, with the greatest accuracy, whether there be or be not organic affection of the lungs or heart. The medical practitioner, therefore, who has the charge of the invalid on the voyage, or who first sees him on his reaching Europe, should not neglect to examine the chest most scrupulously, whenever there is cough, difficulty of breathing, or irregularity in the circulation; and if any disease be detected there, the hepatic or stomach affection should be made quite a secondary consideration, and every effort should be used to check the more dangerous malady that has supervened. A few days of exposure to a cold or variable atmosphere may render the thoracic complaint incurable; and, therefore, seclusion in a regulated temperature should be enjoined, while local bleeding, blistering, and antimonials, are substituted for mercurials, and other measures pursued for the cure of the abdominal disorder. The invalid should be recommended to confine himself to his cabin, if on the voyage; or within doors, if landed, in the most sheltered situation which the country can present. It is really lamentable to see men returned from a tropical

climate, walking about the streets of London, or going to places of amusement, in the cold raw evenings of Winter, while the hacking cough, emaciated figure, and variegated countenance, proclaim a condition of the lungs which ill comports with this exposure to the vicissitudes of a northern climate.

The pulmonic affection which is caused by and supervenes on derangement of the liver and digestive organs, may occasionally, perhaps, be discriminated, especially in the early stage, from that which commences originally in the chest, and proceeds from scrofula, or phthisical disposition of the constitution. The cough is at first dry, or only accompanied by a trifling expectoration of mucus—the spirits are more depressed—the countenance more sallow than in the idiopathic forms of pulmonary disease. The paroxysms of cough are generally after eating, and early in the morning—and lying over on the *left* side is apt to excite cough when in bed.

In the progress of the disease, the expectoration becomes more copious, and, from being limpid or glairy, begins to exhibit some suspicious points of a purulent character. This last character gradually becomes more predominant, as the disease advances, and occasionally some streaks of blood are seen. In the commencement of the disease, and consequently where the cough and other phenomena are merely symptomatic of disorder in another quarter, the patient can expand his chest, and go up an ascent with much less breathlessness than in cases where phthisis is advancing, in consequence of a previously tuberculated state of the lungs. In the dyspeptic pulmonary affection, in short, it is the mucous membrane which is generally engaged, especially at the beginning, and, therefore, the pulmonary structure is pervious to the air. In the more advanced stages, the parenchymatous tissue of the lungs becomes condensed, or hepatized—and the mucous membrane of the trachea and bronchia organically change, so as to throw out puriform matter. If there be any disposition to scrofula or tubercles, this disposition is likely to be excited into action by the sympathetic irritation, and then phthisis, of the common and fatal kind, will soon be developed.

In this insidious and dangerous symptomatic disorder of the chest, there is often little or no pain at any fixed point—but there is not unfrequently an uneasy sensation under the sternum—or a dull pain at the pit of the stomach—or fugitive pains, apparently of a muscular character, in various parts of the thorax, or even in the limbs, the spine, &c. It is probable that these are referrible to the disorder of the digestive organs rather than to the affection of the respiratory apparatus. The fever does not take on the regular hectic form so early in the dyspeptic as in the idiopathic phthisis—nor is the emaciation so rapid.

It will be evident to the medical practitioner that these are only *modified* symptoms of original pulmonary disease, and consequently offer no certain criterion that the disease is symptomatic of derangement in the

digestive organs. The presence of this last derangement, however, as indicated by flatulence, irregularity of bowels, depraved secretions, furred tongue, loss of appetite, tenderness and fullness of the epigastrium, and a variety of nervous and hypochondriacal phenomena, will assist the diagnosis. But the grand object is to determine the period when *symptomatic disorder* is passing into the state of *actual disease*—and this, I maintain, cannot be done by any investigation of symptoms, however minute, short of exploration of the chest by means of auscultation and percussion. Yet, on this distinction between the two states, the whole question of treatment hinges.

Dr. Philip has divided this disease into four stages, in which, he acknowledges, the prognosis and mode of treatment are different. 1mo. The pulmonic affection is merely sympathetic, and ceases with the removal of its cause. This stage is short in duration, mild in symptoms, and accompanied by no expectoration except some phlegm with the cough. 2ndo. The sympathetic has produced actual disease in the lungs, indicated by some degree of inflammation in the bronchia, and admixture of pus-like substance in the expectoration, sometimes blood. The tendency to fever is now greater, yet seldom in the hectic form. It is at this period, Dr. Philip thinks, that tubercles begin to form. But at the time Dr. P. wrote, we had not the means of ascertaining this circumstance, or in fact, of knowing what were the organic changes that might be commencing or making progress in the lungs—nay, we had not the means of saying whether organic change had actually begun. Hence the diagnosis was mere guess-work. The ulterior stages are the same as in idiopathic phthisis, and on these it is unnecessary to remark. Dr. Philip says, that it is *after* fulness and tenderness have taken place in the epigastric region, that the derangement of the digestive organs affects the pulmonary function. But how long after, or *when* it begins to affect the pulmonary *structure,* neither he nor any man can tell, without the method of exploration alluded to, which is a discovery of only recent date. Without this investigation then, we may be too early in our treatment of the pulmonic affection, or too late. The *former* error is dangerous, but the *latter* is fatal to the patient. If auscultation were attended with no other advantage than this discrimination of the two stages of dyspeptic phthisis (considered so very prevalent in this country), it would be the most valuable discovery of the present century.

The treatment of the first stage of this disorder will be almost entirely directed against the hepatic and gastric affections on which it depends; and this will be stated farther on. But even in this stage, much may be done by regimen, attention to dress, and regulation of temperature, in saving the organs of the chest from any increase of disorder in their function, or risk of change in their structure. This attention cannot injure the dyspeptic disorder, but, on the contrary, contribute to

its removal; while a neglect on this point may allow a symptomatic to change into an organic disease, when the chance of recovery must be small indeed.

So few opportunities are afforded of ascertaining the state of the lungs, by dissection, in the early stage of stomach-cough, or dyspeptic phthisis (as it has been improperly called, for, in the early stage, it is not phthisis at all), that we have no other means of knowing what is passing, than by auscultation and percussion. In those cases where the cough is purely symptomatic, and where there is no other disease of the chest, the sound will be clear in all parts, and the air will be heard permeating the parenchyma of the lungs in every direction. In many instances where I have examined the chest, and where there were only the phenomena of sympathetic affection, I have found some portions of lung, epecially in the right side, where no respiration could he heard, and where the sound was quite dull. By blistering, antimonials, colchicum, and seclusion, these points have regained their integrity of function, and the sound has returned. Hence I am led to conclude, that one of the first changes that takes place, where symptomatic is passing into structural disease, is a condensation of the parenchymatous substance of the lungs, by no means incompatible with restoration.

It is probable, however, that the *very first change* is that of *irritation* of the mucous membrane of the trachea and bronchia, passing into a low kind of *inflammation*, with a corresponding change from a dry cough to one with some slight fever and expectoration. Condensation, or hepatization, as it is called, is likely to be the next change; and this supposition is, I think, strengthened by the fact, as ascertained by the stethoscope, that *hepatization* in the right side is the most common of all organic affections which we find in the lungs of people somewhat advanced in dyspeptic phthisis. In the ulterior stages, the lungs present, of course, on dissection and auscultation, the same phenomena as in regular idiopathic phthisis, so widely prevalent and so destructive in this country.

I shall adduce no more reasons than are pointed out above, why the medical attendant should minutely examine the state of the chest, where cough has supervened on disorder of the digestive organs. A delusive hope that the former may be safely overlooked, and that its removal will follow, as a matter of course, the improvement of the hepatic and digestive functions, may very often cause the practitioner a world of chagrin afterwards, when he finds his patient getting worse, and when an alteration in the treatment and prognostication will betray an error in the first opinion that was formed. Whereas, by careful examination of the chest, in the first instance, the practitioner will be enabled to form a more correct estimate, and, consequently, to give a more guarded prognosis—

circumstances that will be very useful to him, if the disease take a serious turn in the sequel.

Should an examination of the thoracic organs shew the existence of organic disease in the lungs, no time is to be lost in sending the patient to the most beneficial atmosphere, where the temperature should be regulated, and every possible means employed to arrest the progress of pulmonary disease. So much difference of opinion prevails respecting the climates of France and Italy, that it is difficult to say where the patient should go. If other things were equal, Nice or Naples would appear to afford a fairer prospect than the gloomy skies of England—at least before any purulent expectoration appears. When a breach of structure is once made in the lungs, a warm climate does no good, but rather increases the evil, or accelerates death.

When puriform matter begins to issue from the lungs, whether from broken-down tubercles, a common vomica, or a diseased surface of mucous membrane, I apprehend a great revolution is taking place in the general treatment. From several cases which have been under my own care, I am confident that the tonic plan, combined with local depletion and counter-irritation, is infinitely superior to the asses' milk and hermit's diet on which phthisical patients are usually kept. In external scrofulous sores, our great object is to improve the general health, and increase the general strength—and why should not the same plan be pursued when there is an internal abscess or ulcer? I think we too often confound the fever of irritation—or, in other words, the phenomena of hectic, with inflammation—and that the means used to subdue this fever have too often increased it. Several cases have fallen under my notice, where the expectoration was purulent—the pulse ranging from 110 to 140—with hectic fever and perspirations, and, in short, all the symptoms of established phthisis; and yet, where the whole of these phenomena disappeared under the administration of the sulphate of quinine in well acidulated infusion of roses, aided by light animal food—sponging the chest twice a day, with tepid vinegar and water, and obviating pain in the chest by blisters—antimonial ointment—and occasional leeching. This, too, was done without any other air than that of London, Pentonville, and Brompton.

TROPICAL HYGIENE;

OR,

HINTS FOR THE PRESERVATION OF HEALTH IN ALL HOT CLIMATES.

Non Minor est virtus, quam quærere, parta tueri,
Nec minus artis opus, vegetam servare salutem,
Quam fuerit, recto medicamine ducere morbos.

De Homine Sano et Egroto Carmen.

As prevention is better than cure, it might seem more natural to have detailed the means of preserving health, before entering on the treatment of diseases themselves. This plan has accordingly been adopted by Dr. Moseley; but I think it an injudicious one. In describing *effects* I have traced pretty minutely their *causes;* and in that way must have obviated a vast tautology in this part of the work. Besides, by exhibiting both causes and effects in one view, I am convinced that the salutary impression is always stronger. For example, could the gravest anathema, denounced with all due solemnity, against sleeping ashore on insalubrious coasts, excite half so much interest in the mind of an European, as the fatal catastrophe at Edam Island?—But another great point is gained by this plan. The various reasonings and remarks which accompanied the treatment and description of diseases, will enable even the general reader to comprehend, with infinitely more ease, the *rationale* of those prophylactic measures which I am now to delineate; and which, at every step, will recall to his memory the deplorable effects resulting from a contempt of them. This is no inconsiderable object; for we all know the gratification which springs from understanding what we read. And, in truth, it is a pleasure—nay, it is a positive advantage, to be able to explain, even on a *false theory,* the principles of a *useful practice.* But as theory, in this instance, at least, is the legitimate offspring of experience, so, I trust, the superstructure is as firm as the foundation.

It has been remarked, by a very competent judge, "that by taking the general outline of indigenous customs for our guide, if we err, it will be on the safe side." This is a good rule; but unfortunately it is impracticable—by those, at least, who stand most in need of one. For, before we can become acquainted with these indigenous customs, it will be too late for many of us to adopt them; and could we see them at one *coup*

d'œil, when we first enter a tropical climate, how are we to avail ourselves of them, unless they happen to be in unison with the habits of our countrymen already resident there, who would not fail to sneer at the adoption of any plan which had not the sanction of their superior experience. But, independently of this, it would be strange if the progress which has been made in the knowledge of the animal economy, as well as in other sciences, did not enable us to correct many "indigenous customs," which in reality, have ignorance, superstition, or even vice, for their foundation. This applies particularly to the Eastern World, where the natives are neither in a state of nature, nor yet refinement; but where we see a strange medley of ludicrous and ridiculous customs—of Hindoo and Mahommedan manners, from which the European philosopher may glean much useful local knowledge, while he exercises his reason and discrimination, in separating the grain from the chaff.

Another advice has been given us; namely, to observe and imitate the conduct of our own countrymen long resident in the climate. This is certainly the most practicable; but, in my opinion, it is not the safest plan. And for this plain reason, that *residence* alone confers on them immunities and privileges, of which it would be unsafe for us, in many instances, to claim a participation, before the period of our probation has expired. Thus far, and no farther, there is truth in the commonly received doctrine of acclimatization, or seasoning; and I think I shall, on the other hand, be able to shew, hereafter, that the unseasoned European may apply with safety, certain preventive checks to the influence of climate which would be inconvenient, if not hazardous, to those on whom the said influence had long operated. The stranger, then, must go with the general stream of society, especially at the beginning; but there is no situation, even here, where he may not obviate, in a great measure, the first and most dangerous effects of the new climate, by a strict observance of two fundamental rules—TEMPERANCE and COOLNESS. The latter, indeed, includes the former; and, simple as it may appear, it is, in reality, the grand principle of intertropical hygiene, which must ever be kept in view, and regulate all our measures for the preservation of health.

Common sense, independently of all observation or reasoning on the subject, might, *à priori*, come to this conclusion. From *heat* spring all those effects which originally *predispose* to the reception or operation of other morbific causes. And how can we obviate these effects of *heat*, but by calling in the aid of its antagonist, *cold*.* To the *sudden* application of the *latter*, after the *former* has effected its baneful influence on the human frame, I have traced most of those diseases attributable to climate;

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* I overlook the useless litigation respecting cold being the absence of heat.

nothing, therefore, can be more reasonable, than that our great object is to moderate, by all possible means, the *heat*, and habituate ourselves, from the beginning, to the impressions of cold. The result will be, that we shall thereby bid defiance, to the alternations or *vicissitudes* of both these powerful agents. This is, in truth, the grand secret of counteracting the influence of tropical climates on European constitutions; and its practical application to the common purposes of life, as well as to particular exigencies, it shall now be my task to render as easy and intelligible as I can. For the sake of perspicuity, I shall here, as hitherto, class my observations under separate heads; though, from the nature of the subject, I shall consider myself much less tied down to forms than in the two preceding parts of the Essay; and, consequently shall not be over nice in confining myself to a dry, didactic rehearsal of medical rules and precautions. The scope and purport of any digression, however, shall always point to my principal design—the preservation of health.

I.—Dress.

I shall not stop here to enquire whether this be an unnecessary luxury of our own invention, or originally designed for us by our Creator. The force of habit is, no doubt, great; and the Canadian, who, in reply to the European's inquiry respecting his ability to bear cold applied to his naked body, observed, that "he was *all* face," gave no bad elucidation of the affair. Passing over the great African peninsula, where man enjoys that happy state of nudity and nature, mental as well as corporeal, on which our learned philosophers have lavished such *merited* encomiums, we come to the ancient and civilized race of Hindoos; and here, too, we shall be constrained to admire the almost omnipotent power of custom, as exemplified in the persons of some of the first objects that arrest our attention.

The habiliment of the Bengal *dandy*, or waterman, who rows or drags our *budjrow* up the Ganges, consists of a small, narrow piece of cloth (doty) passed between the thighs, and fastened before and behind to a piece of stout packthread that encircles the waist. In this dress, or undress, corresponding pretty nearly to the *fig-leaf* of our great progenitor, he exposes his skin to the action of a tropical sun—a deluge of rain, or a piercing *north-wester*, with equal indifference! After "tugging at the oar," for hours together, in the scorching noontide heat, till perspiration issues from every pore, he darts overboard, when necessary, with the track-rope on his shoulder, and wades through puddles and marshes—this moment up to the middle or the shoulders in water—the next, in the open air, with a

rapid evaporation from the whole surface of his body! All this, too, on a scanty meal of rice, being seldom paid more than—*three pence per day board wages!*

Here is one of those indigenous customs, which we shall not find it very safe to imitate; though many of our keen European sportsmen have undergone for pleasure, or in search of a snipe, what the poor *dandy* is forced to perform for a livelihood. It is hardly necessary to remark, that such pursuits are at the risk of life, and are highly destructive of health.

But, independent of habit, Nature has previously done a great deal towards the security of the *dandy*, by forming the *colour*, and in some respects, the *texture*, of his skin, in such a manner, that the extreme vessels on the surface are neither so violently stimulated by the heat, nor so easily struck torpid by sudden transitions to cold. Certain it is, that the action of the perspiratory vessels, too, is different from that of the same vessels in Europeans—at least, they secrete a very different kind of fluid; being more of an oily and tenacious nature than the sweat of the latter. This, in conjunction with the oil so assiduously and regularly rubbed over the surface, every day, by all ranks and casts of both sexes, must greatly tend to preserve a softness and pliability of the skin, and a moderate equable flow of perspiration.*

But if we look beyond the hardy and labouring castes of natives, we observe both Hindoo and Mahomedan guarding most cautiously against solar heat, as well as cold. The *turban* and *cummerbund* meet our eye at every step:—the former, to defend the head from the direct rays of a powerful sun; the latter, apparently for the purpose of preserving the important viscera of the abdomen from the deleterious impressions of cold. This (cummerbund) is certainly a most valuable part of their dress; and one that is highly deserving of imitation.

Such are the *essential* articles of native dress; the light, flowing robes of cotton, silk, calico, &c. varying according to the taste or circumstances of the wearer, and being more for ornament than use. A very good substitute for the *turban* is a large cotton handkerchief, folded up in the hat; and where we are exposed to the direct influence of solar heat, it may, with much advantage, be kept moistened with water. In situations where atmospherical vicissitudes are sudden, a fine shawl round the waist forms an excellent *cummerbund*, and should never be neglected, especially by those who have been some time in the country, or whose bowels are in any degree tender.

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* It is curious, that the upper classes of native ladies, especially Mahomedan, as if determined that nothing of European complexion should appertain to them, are in the habit of staining red, with the *mindy*, or hinna plant, the palms of their hands and soles of their feet, the only parts of the external surface where the *rete mucosum*, or seat of colour among them, cannot maintain its deep tint, on account of the friction.

When we enter the tropics, we must bid adieu to the luxury of linen—if what is both uncomfortable and unsafe, in those climates, can be styled a luxury. There are many substantial reasons for so doing. Cotton, from its slowness as a conductor of heat, is admirably adapted for the tropics. It must be recollected, that the temperature of the atmosphere, *sub dio*, in the hot seasons, exceeds that of the blood by many degrees; and, even in the shade, it too often equals, or rises above, the heat of the body's *surface*, which is always, during health, some degrees below 97°. Here, then, we have a covering which is *cooler* than linen; inasmuch as it conducts more slowly the *excess* of external heat *to* our bodies. But this is not the only advantage, though a great one. When a *vicissitude* takes place, and the atmospherical temperature sinks suddenly far below that of the body, the cotton, still faithful to its trust, abstracts more slowly the heat *from* our bodies, and thus preserves a more steady equilibrium there. To all these must be added the facility, with which it absorbs the perspiration; while linen would feel quite wet, and, during exposure to a breeze under such circumstances, would often occasion a shiver, and be followed by dangerous consequences.

That woollen and cotton should be *warmer* than linen in low temperatures, will be readily granted; but that they should be *cooler* in high temperatures, will probably be much doubted. If the following easy experiment be tried, the result will decide the point in question. Let two beds be placed in the same room at Madras, we will say, when the thermometer stands at 90°; and let one be covered with a pair of blankets, the other with a pair of linen sheets, during the day. On removing both coverings in the evening, the bed on which were placed the blankets will be found *cool* and pleasant; the other uncomfortably warm. The reason is obvious. The linen readily transmitted the heat of the atmosphere to all parts of the subjacent bed; the woollen, on the contrary, as a nonconductor, prevented the bed from acquiring the atmospherical range of temperature, simply by obstructing the transmission of heat from without. This experiment not only proves the position, but furnishes us with a grateful and salutary luxury, free of trouble or expense.—The musical ladies of India are not unacquainted with this secret, since they take care to keep their pianos well covered with *blankets* in the *hot season*, to defend them from the heat, and prevent their warping.

From this view of the subject, *flannel* might be supposed superior to *cotton;* and, indeed, at certain seasons, in particular places—for instance, Ceylon, Bombay, and Canton, where the mercury often takes a wide range, in a very short space of time, the *former* is a safer covering than the latter, and is adopted by many experienced and seasoned Europeans. But, in general, flannel is inconvenient, for three reasons. First, it is too heavy: an insuperable objection. Secondly, where the temperature of the atmosphere ranges pretty steadily a little below that of the skin, the flannel is

much too slow a conductor of heat *from* the body. Thirdly, the spiculæ of flannel prove too irritating, and *increase* the action of the perspiratory vessels on the surface, where our great object is to *moderate* that process. From the second and third objections, indeed, even cotton or calico is not quite free, unless of a fine fabric, when its good qualities far counterbalance any inconvenience in the above respects.

In some of the upper provinces of Bengal, where the Summer is intensely hot, and the Winter sharp, the dress of native shepherds, who are exposed to all weathers, consists of a blanket, gathered in at one end, which goes over the head, the rest hanging down on all sides like a cloak. This answers the triple purpose of a *chattah* in the Summer, to *keep out* the heat—of a tent in the rainy season to throw off the wet—and of a coat in the Winter, to defend the body from the piercing cold. Hence our ridicule of the Portuguese and Spaniards, in various parts of the world, for wearing their long black cloaks in Summer, "*to keep them cool,*" is founded on prejudice rather than considerate observation.

The necessity which tyrant custom—perhaps policy, has imposed on us, of continuing to appear in European dress—particularly in *uniforms*, on almost all public occasions, and in all formal parties, under a burning sky, is not one of the least miseries of a tropical life! It is true that this ceremony is often waived, in the more social circles that gather round the dinner-table, where the light, cool, and elegant vestures of the East supersede the cumbrous garb of Northern climates. It is certainly laughable, or rather pitiable enough, to behold, for some time after each fresh importation from Europe, a number of *griffinish* sticklers for decorum, whom no persuasions can induce to cast their *exuviæ*, even in the most affable company, pinioned, as it were, in their stiff habiliments, while the streams of perspiration that issue from every pore, and ooze through various angles of their dress, might almost induce us to fear that they were on the point of realizing Hamlet's wish; and that, in good earnest, their

> "Solid flesh would melt—
> "Thaw, and resolve itself into a dew!"

It too often happens, however, that a spice of ceremony attaches to the kind host—or perhaps hostess, in which case, as no encouragement will be given to derobe, the poor griffin must fret and fume, with prickly heat and perspiration, till the *regalement* is concluded. By this time he is, doubtless, in an excellent condition for encountering the raw, chilling vapours of the night on his way home.

It were "a consummation devoutly to be wished,"—though, I fear, little to be expected, that the European badges of distinction, in exterior decoration, could be dispensed with at all festivals, public and private—formal, social, or domestic, within the torrid zone. It requires but the most superficial glance to perceive, that coolness during our repasts is salutary, as

well as comfortable; and that, from the extensive sympathies existing between the skin and several important organs, particularly the stomach and liver, the converse of the position is equally true; especially as, in the *latter* case, we are led a little too much to the use of "gently stimulating liquids," to support the discharge; the bad consequences of which are pointed out at page 9 of this Essay, and will be again considered in the section on Drink.*

There is an injurious practice, into which almost every European is led, on visiting a tropical climate, but particularly the Eastern world, which has never been noticed, I believe, by medical writers, though well entitled to consideration. In the country last mentioned, body linen, or rather cotton, is remarkably cheap, and washing is performed on such moderate terms, that one hundred shirts may be even *bleached* for about 10s. sterling on an average. A large stock of these useful articles is, then, the first object of northern strangers, which "*Blackey*," indeed, knows full well, and takes especial care to turn to his own advantage. But this is a trifling consideration.—The European, contemplating, with great satisfaction, the multitude of changes he has thus cheaply amassed, and calculating on the very reasonable terms of ablution, determines to enjoy, in its fullest extent, a luxury which he deems both salutary and grateful, independently of all considerations respecting appearance. It is, therefore, very common to see him shift his linen three or four times a-day, during the period of his novitiate, when perspiration is, indeed, superabundant. But let me assure him that he is pursuing an injudicious,—nay, an injurious system; that the fluid alluded to, already in excess, is thus powerfully solicited; and the action of the perspiratory vessels, with all their associations, morbidly increased, instead of being restrained. But, what is to be done? The newly-arrived European justly observes, that he finds himself drenched with sweat three or four times a-day, in which state he cannot remain with either safety or comfort. Certainly it would be useless to point out the evil without suggesting the remedy; and happily it may be obviated, to a considerable extent, in a very simple and easy manner. In those climates, when linen becomes wet in a few hours with perspiration, it by no means follows that it is soiled thereby, in any material degree. It should not, therefore, be consigned to the wash, but carefully dried, and *worn again;* and that, too, without the smallest infringement on the laws of personal cleanliness, but with the most salutary effect on the health. It is astonishing how much less exhausting is the linen which has been impregnated with the fluid of perspiration, than that which is fresh from the mangle. By this plan, no more than two shirts are rendered unfit for use every day;

* I am sorry to learn that European habiliments and *regimentals* are still *more* in use on all occasions of festivity now, than in my time, in India. Nothing can be *worse* policy, with all due submission to their High Mightinesses, the Nabobs of the East.

and in cool weather, or at sea, not more than one. Necessity, the mother of invention, first taught me this piece of knowledge, in consequence of having lost my stock once, by sailing suddenly from Trincomalee; but I know that, however trivial the circumstance may *appear*, an attention to what I have related will, in reality, prove more beneficial than precautions of seemingly greater magnitude. Its rationale is in direct unison with the grand and fundamental object in tropical prophylactics—TO MODERATE, WITHOUT CHECKING, THE CUTICULAR DISCHARGE.

The property which *frequent* change of linen has, in exciting cuticular secretion, and the effects resulting from the sympathy of the skin with the stomach, liver, and lungs, may account, in a great measure, for the superior health which accompanies cleanliness in our own climate; and, on the contrary, for the diseases of the indigent and slovenly, which are almost invariably connected with, or dependent on, irregularity or suppression of the cuticular discharge. Intelligent females well know the *peculiar effect* of clean linen on themselves, at particular periods.

To the above observations on dress, I may add, that no European should, where he can avoid it, expose himself to the sun between the hours of ten and four in the day. If forced, during that period, to be out of doors, the chattah should never be neglected, if he wish to guard against coup de soleil, or some other dangerous consequence of imprudent exposure.

II.—FOOD.

ALTHOUGH I entirely agree with Celsus, that "*sanis omnia sana;*" and with a late eminent physician, that an attention to *quantity* is of infinitely more consequence than *quality* in our repasts; and, although I also believe that an over fastidious regard to *either* will render us unfit for society, and not more healthy after all; yet, when we change our native and temperate skies of Europe for the torrid zone, many of us may find, when it is too late, that we can hardly attend too strictly to the quantity and quality of our food, during the period of assimilation, at least, to the new climate; and, that a due regulation of this important non-natural will turn out a powerful engine in the preservation of health.

It is now pretty generally known, from dire experience, indeed, that instead of a disposition to *debility and putrescency*, an inflammatory diathesis, or tendency to plethora, characterises the European and his diseases, for a year or two, at least, after his arrival between the tropics; and hence provident Nature endeavours to guard against the evil, by diminishing our relish for food. But, alas! how prone are we to spur the

jaded appetite, not only "by dishes tortured from their native taste," but by the more dangerous stimulants of wine or other liquors, as well as condiments and spices, which should be reserved for that general relaxation and debility which unavoidably supervene during a *protracted residence* in sultry climates. Here is an instance where we cannot *safely* imitate the seasoned European. Indeed, there are no points of Hygiene, to which the attention of a new-comer should be more particularly directed, than to the *quantity and simplicity* of his viands; especially as they are practical points entirely within his own superintendence, and a due regulation of which, is not at all calculated to draw on him the observation of others—a very great advantage.

Every valetudinarian, particularly the hectic, knows full well the *febrile paroxysm* which follows a full meal: the same takes place in every individual, more or less, whatever may be the state of health at the time. How cautious, then, should we be, of exasperating these natural paroxysms, when placed in situations where various *other* febrific causes are constantly impending over, or even assailing us! The febrile stricture which obtains on the surface of our bodies, and in the secerning vessels of the liver, during the *gastric digestion* of our food, as evinced by diminution of the cutaneous and hepatic secretions, will, of course, be proportioned to the duration and difficulty of that process in the stomach, and to the quantity of ingesta; and as a corresponding *increase* of the two secretions succeeds, when the chyme passes into the intestines, we see clearly the propriety of moderating them by abstemiousness, since they are already in *excess* from the heat of the climate alone, and this excess is one of the first links, in the chain of causes and effects, that leads ultimately to various derangements of function and structure in important organs, as exemplified in hepatitis, dysentery, and in many parts of this Essay.

That vegetable food, generally speaking, is better adapted to a tropical climate than animal, I think we may admit, and particularly among unseasoned Europeans:—not that it is quicker or easier of digestion (it certainly is slower in this respect), but it excites less commotion in the system during that process, and is not so apt to induce plethora afterwards. It is very questionable whether the ancient Hindoo legislators had not an eye rather to policy than health, when they introduced the prohibition of animal food as a divine mandate.—They probably thought, and in my opinion with good reason, that the injunction would tend to diffuse a more humane disposition among the people, by strongly reprobating the effusion of blood, or depriving any being of existence; and these prejudices were admirably sustained by the doctrine of transmigration.

But, whatever might have been the medical objections of BRAMHA to carnivorous banquets, certain it is, that a race of what may now come un-

der the denomination of "*natives*" (the Mahomedans), amouting to, perhaps, a seventh or eighth of the whole population, make no scruple of indulging freely in most kinds of animal food: who, in the face of the shuddering Hindoo, will sacrilegiously slay and eat that great Indian deity, the *cow;* and who, in their turn, look with perfect abhorrence on the polluted Englishman, who regales himself—not, indeed, on four-footed deity, but, in the Mussulman's opinion, with worse than cannibalism, on devil incarnate—PORK! Yet Hindoo, Mahomedan, and European—at least, the two first, while *moderation* is observed in their respective meals, enjoy equal health, and attain equal longevity.

If, however, we critically examine the different castes, or rather classes of society, in India, we shall find that their physical powers and appearances are considerably modified by their manner of living. Nothing strikes the stranger with greater astonishment than the personal contrast between the rich and the poor! Almost the whole of the upper classes are absolutely FALSTAFFS; and often have I been puzzled to know how some of them could stow themselves away in a palankeen, and still more so, how their bearers could trot along under the pressure of such human porpoises! The truth is, that the Hindostanee fops (and most of the superior orders are such) pride themselves above all things, on rotundity of corporation, and particularly on the *magnitude of their heads.*

To acquire such elegant distinctions, one would be tempted to suspect that they occasionally broke the vegetable *regime,* and indulged in better fare than BRAMHA thought proper to prescribe. But no; all this is accomplished by *ghee* and indolence! Of the former, which is a kind of semi-liquid butter, made by evaporating the aqueous part from the rich milk of the buffalo, they swill immense quantities; and whatever we may hear from the *fireside* travellers, of Hindoo temperance and abstemiousness, these gentry contrive to become as *bilious* occasionally, as their European neighbours, and manage to curtail the natural period of their existence full as efficaciously as their brother "*gourmands*" on this side of the water—making their exits, too, by the same short routes of apoplexy, and other fashionable near cuts to heaven.

The lower, or industrious classes, on the other hand, who live almost exclusively on vegetables, certainly bear a striking resemblance to "Pharoah's lean-fleshed kine." But, although they have not the physical strength of an European, they make up for this in what may be termed "*bottom;*" for it is well known, that a native will go through three times as much fatigue, under a burning sky, as would kill an Englishman outright—witness the palankeen bearers, coolies, dandies, hircarrahs, &c. Nor is temperance always a prominent feature in the character of these gentry; for, what with bang, toddy, arrack, opium, and other inebriating materials, which all countries produce in some shape or other, and which

all nations have shewn their ingenuity in manufacturing, they not seldom "muddle their brains," with as much glee as the same description of people in our own latitudes. Those, on the other hand, who, from local situation, poverty, or principle, adhere to the dictates of their religion and caste with great pertinacity, and seldom admit animal food within the circle of their repast (milk excepted), are certainly exempted from numerous ills that await our and their countrymen, who transgress the rules of temperance. Yet, when they are overtaken by disease, they have not *stamina*, and debility characterises the symptoms. Upon the whole, I am inclined to think that, taking the average longevity of all ranks and classes throughout the vast oriental peninsula, the period of human life falls a full *eighth* short of its European range. But as this does not quadrate with the opinions of speculative philosophers at home, who *will* equalize the age of man all over the world, I shall cite the authority of a very intelligent officer, whom I have so often quoted before, and who had some twenty years' acquaintance with the country in question. "Longevity," says he, "certainly is not characteristic of India. Whether this is owing to the excessive heat, or the indolence of the upper and drudgery of the lower classes, it may be difficult to decide; but certain it is, that we rarely see an instance of *any one* arriving at sixty years of age."*

From indigenous customs, then, in respect to animal and vegetable food, we can draw no inference that absolutely prohibits the *former*, but enough to convince us that, during the first years of our sojourn between the tropics, we should lean towards the Hindoo model; and as the tone of the constitution becomes lowered or assimilated, we may safely adopt the Mahomedan manners.

The period of our meals in hot climates, indeed in all climates, is worthy of notice. Both Hindoo and Mahomedan breakfast early—generally about sunrise. Their early hours cannot be too closely imitated by Europeans. This is a very substantial meal, particularly with the Hindoo; for rarely does he take any thing else till the evening: a custom, in my opinion, that would be very prejudicial to Europeans.—Breakfasts, among the latter, are often productive of more injury than dinners, especially where fish, eggs, ham, &c. are devoured without mercy, as not unfrequently happens. Many a nauseous dose of medicine have I been obliged to swallow from indulging too freely in these articles; but I saw my error before it was too late. Most people suppose, that as a good appetite in the morning is a sign of health, so they cannot do sufficient honour to the breakfast table; but the stomach, though it may relish, is seldom equal to the digestion of such alimentary substances as those alluded to, where a sound night's rest has hardly ever been procured. I have seen the most unequi-

* Oriental Field Sports, vol. 1, p. 236.

vocal bad effects from heavy breakfasts in others, as well as in my own person; and I shall relate one instance that may well serve as a drawback upon the pleasures of a luxurious *déjeuné* in the East. Mr. B————, Purser of a frigate, a gentleman well known on the station, was as determined a *bon vivant* as ever I had the honour of being acquainted with. "*De mortuis nil nisi verum.*"—He certainly had possessed a most excellent constitution; for I have seen it perform prodigies, and falsify the most confident medical prognostications! He had served many years in the West Indies, where he passed through the usual ordeals of yellow fever, dysentery, &c. with *éclat;* and he came to the East with the most sovereign contempt for every maxim of the hygeian goddess! Although he never neglected, even by accident, his daily and nightly libations to the rosy god, yet no sportsman on the Caledonian mountains, could do more justice to a Highland breakfast than he. Indeed, he rarely went to sea, without an ample private stock of epicurean provender; and I have seen him thrown into a violent paroxysm of rage, on finding that two nice-looking hams, which he had purchased in China, resisted all attacks of the knife, in consequence of a certain *ligneous* principle, which "FUKKI" had contrived to substitute, with admirable dexterity, for the more savoury fibres of the porker! The items of the *last* breakfast which he made, minuted on the spot by a *German* surgeon who attended him, are now before me. The prominent articles were, four hard-boiled eggs, two dried fishes, two plates of rice, with chillies, condiments, and a proportionate allowance of bread, butter, coffee, &c. Many a time had I seen him indulge in this kind of fare with perfect impunity; but all things have an end, and this proved his final breakfast! He was almost immediately taken ill, and continued several days in the greatest agony imaginable! Notwithstanding all the efforts of the surgeon, no passage downwards could ever be procured till a few hours before his death, when mortification relaxed all strictures. Let the fate of the dead prove a warning to the living!

The newly-arrived European should content himself with plain breakfasts of bread and butter, with tea or coffee; and avoid indulging in meat, fish, eggs, or buttered toast. The latter often occasions rancidity, with nausea at the stomach, and increases the secretion of bile, already in excess. Indeed, a glance at the *Baweerchee,* buttering our toast with the greasy wing of a fowl, or an old, dirty piece of rag, will have more effect in restraining the consumption of this article, than any didactic precept which I can lay down; and a *picturesque* sight of this kind may be procured any morning, by taking a stroll in the purlieus of the kitchen.

In regard to dinner, Europeans appear of late to study convenience rather than health, by deferring that meal till sunset. This was not the case some forty or fifty years ago; and many families, even now, dine at a

much earlier hour, except when tyrant custom and ceremony prevent them. In truth, the modern dinner in India is perfectly superfluous, and too generally hurtful. The *tiffin*, at one o'clock, consisting of light curries, or the like, with a glass or two of wine, and some fruit, is a natural, a necessary, and a salutary repast.—But the gorgeous table—the savoury viands —the stimulating wines of the evening feast, prolonged by the fascination of social converse, greatly exacerbate the nocturnal paroxysm of fever imposed on us by the hand of nature, and break with feverish dreams, the hours which should be dedicated to repose! The consequences resulting from this are quite obvious. It may be observed, that the natives themselves make their principal meal at sunset, when the heat is less distressing, and insects neither so numerous nor teasing; but it must be recollected, that they, in general, eat nothing between breakfast and dinner; and that among the Hindoos and lower classes of Mahomedans, &c. the evening meal is by no means of a stimulating quality, while no provocative variety, or other adventitious circumstances, can have much effect in goading the appetite beyond its natural level. Add to this, that in the upper provinces, among Mahomedans of distinction, who can afford more substantial, and animal food, the dinner hour is *one or two o'clock*, and after that, little or nothing, except coffee, sweetmeats, or fruit, is taken during the evening.

He, then, who consults his health in the Eastern world, or in any tropical climate, will beware of indulging in this *second* and *unnecessary* dinner, particularly during the period of his probation; but will rather be satisfied with the meridian repast, as the *principal* meal, when tea or coffee, at six or seven o'clock in the evening, will be found a grateful refreshment. After this, his rest will be as natural and refreshing, as can be expected in such a climate; and he will rise next morning with infinitely more vigour, than if he had crowned a sumptuous dinner with a bottle of wine the preceding evening. Let but a trial of one week put these directions to the test, and they will be found to have a more substantial foundation than *theory*.

Of supper it is not necessary to speak, as it is a mere matter of ceremony in hot climates, excepting after assemblies, or on some public occasions, which indeed are badly suited to the torrid zone.

A limited indulgence in fruits, during the first year, is prudent. Although I myself never had any reason to believe that they actually occasioned dysentery, yet, where the intestines are *already* in an irritable state, from irregular or vitiated secretions of bile, they certainly tend to increase that irritability, and consequently *predispose* to the complaint in question. Particular kinds of fruit, too, have peculiar effects on certain constitutions. Thus, *mangoes* have something stimulating and heating in them, of a terebinthinate nature, which not seldom brings out a plentiful crop of pustules, or even boils, on the unseasoned European. A patient

of mine, who died from the irritation of an eruption of this kind, had been much addicted to an unrestrained indulgence in fruit, particularly mangoes; —indeed their effect in this way is familiarly known in India. Neither is pine-apple (though very delicious) the safest fruit to make too free with at first. Good ripe shaddocks are very grateful in hot weather, from their subacid and cooling juice, so well adapted to allay the unpleasant sensation of thirst. Plantains and bananas are wholesome and nutritious, especially when frittered. The spices and condiments of the country, as I have before hinted, should be reserved for those ulterior periods of our residence in hot climates, when the tone of the constitution is lowered, and the stomach participates in the general relaxation. They are then safe and salutary.

III.—Drink.

I shall not here attempt to prove, that Water is the simple and salutary beverage designed by Nature for Man, as well as other animals. In every nation, even the most refined and modern, a great majority appear, by their practice at least, to entertain no such belief. They have, with no small ingenuity, contrived so to medicate the native fountain, that they are always either outstripping, or lagging behind, the placid stream of life! The same magic bowl which, this moment, can raise its votaries into heroes and demi-gods, will, in a few hours, sink them beneath the level of the brute creation!

The moralist and philosopher have long descanted on this theme, with little success; for, until people begin to feel the corporeal effects of intemperance, a deaf ear is turned to the most impressive harangues against that deplorable propensity; and even then, but very few have resolution and fortitude to stem the evil habit! Let us do our duty, however, in conscientiously portraying the effects of drink in a tropical climate.

I have already observed, that the grand secret, or fundamental rule, for preserving health in hot countries, is, "to keep the body cool." I have also alluded to the strong sympathy that subsists between the skin and several internal organs, as the stomach, liver, and intestinal canal. On this principle, common sense alone would point out the propriety of avoiding heating and stimulating drink, for the same reasons that we endeavour to guard against the high temperature of the climate. But no; a wretched, sensual theory has spread from the vulgar to many in the profession (who ought to know better), that since the heat of the climate occasions a profuse perspiration, and consequently renders that discharge the more liable to a sudden check, we are to aid and assist these natural causes by the use

of "*gently stimulating liquids,*" and, of course, increase those very effects which we pretend to obviate! "A little shrub and water," says Mr. Curtis (Diseases of India), "or madeira and water," *between meals,* is useful, and in some measure *necessary,* to keep up the tone of the digestive organs, and to supply (i. e. augment) the waste occasioned by an excessive perspiration."—p. 281. I can assure Mr. Curtis that, however *necessary,* this practice might have been thought in his time (forty years ago), it is *now* considered not only *unnecessary,* but disgraceful; and that in no respectable circle in the Eastern world, beyond the confines of the "*Punch-house,*" where no European of character will ever be seen (especially in Bengal), is any sangaree, porter-cup, or other "gently stimulating liquid," made use of "between meals." And I take this opportunity of informing and warning every *new-comer,* that the very call of "*brandy-shrub pauny!*" will endanger his being marked as a "*vitandus-est,*" and that a perseverance in such habit will inevitably, and very quickly too, exclude him from every estimable circle of his own countrymen, who will not fail to note him as in the high road to ruin!

Nor did these most excellent habits of temperance originate in any medical precepts or admonitions—far from it! The professional adviser was by no means solicitous to inculcate a *doctrine,* which it might not suit his taste to *practise.* But in a vast empire, held by the frail tenure of opinion, and especially where the current of religious prejudices, Brahmin as well as Moslem, ran strong against intoxication, it was soon found necessary, from imperious motives of policy, rather than of health, to discourage every *tendency* towards the acquisition of such dangerous habits. Hence the inebriate was justly considered as not merely culpable in destroying his own health, *individually,* but as deteriorating the European character in the eyes of those Natives, whom it was desirable at all times to impress with a deep sense of our superiority. Happily, what was promotive of our *interest,* was preservative of our health, as well as conducive to our happiness; and the general temperance in this respect, which now characterises the Anglo-Asiatic circles of society, as contrasted with Anglo-West-Indian manners, must utterly confound those fine-spun theories, which the votaries of porter-cup, sangaree, and other "gently stimulating liquids," have invented about—"supporting perspiration," "keeping up the tone of the digestive organs," &c. all which *experience* has proved to be not only *ideal,* but *pernicious!* "On the meeting together of a company of this class" (planters), says a modern writer on the West Indies, "they were accustomed *invariably,* to sit and continue swilling strong punch (sometimes half rum), and smoking segars, till they could neither see nor stand; and he who could swallow the greatest quantity of this *liquid fire,* or infuse in it the greatest quantity of ardent spirits, was considered the cleverest fellow."—*Account of Jamaica and its Inhabitants,* 1808.—p. 189. And again: "The inferior orders, in the towns, are by

no means exempt from the reproach of intemperance; nor are the more *opulent classes*, generally speaking, *behind hand* in this respect. Sangaree, arrac-punch, and other potations, are pretty *freely drunk, early in the day*, in the taverns."—p. 199.

I can conceive only one plausible argument which the transatlantic Brunonian can adduce in support of his doctrine, after the unwelcome *denouement* which I have brought forward respecting oriental customs; namely, that as the range of atmosperic heat, in the West Indies, is several degrees *below* that of the East, it may be necessary to counterbalance this deficit of *external* heat, by the more assiduous application of *internal* stimulus! For this hint he will, no doubt, be much obliged to me, as he must consider the argument irresistible.

I may here remark, that too much praise cannot be given to the Captains of East Indiamen, for the lessons of temperance and decorum that are generally taught on board their ships (whatever may be the motives) during the outward bound passage. The very best effects result from this early initiatory discipline, in a thousand different ways. Rarely, indeed, in the vessels alluded to, does the decanter make more than half a dozen tours (often not so many) after the cloth is removed at dinner, before the company disperse, by a delicate but well-known signal, either to take the air upon deck, or amuse themselves with books—chess—music, or the like, till the evening. After a very frugal supper, the bottle makes a tour or two, when the significant toast of—"*Good night, ladies and gentlemen!*" sends every one, at an early hour, to repose.

It may readily be conceived, of what incalculable utility three or four months' *regimen* of this kind must prove to Europeans, approaching a tropical climate; especially when policy and imperious custom will enforce its continuance there! It is true that at each of the presidencies, there may be found several individuals of the old bacchanalian school, whose wit, humour, or vocal powers, are sometimes courted, on particular occasions, to—"set the table in a roar." But let not such expect to mingle in the *domestic* circles of respectable society (where alone true enjoyment is to be found) either in the civil or military departments. No such thing as a regimental mess exists in India,* and as convivial association thus becomes perfectly optional, the least tendency to inebriety will assuredly *insulate* the individual who, from solitary indulgence and reflection, soon falls a martyr to the baneful effects of INTEMPERANCE.

The navy presents a different aspect. Fewer of these have an opportunity of becoming acquainted with the domestic manners either of the natives or Europeans on shore; and therefore they more frequently pursue

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* This, I believe, is now altered, and there are regimental messes, the same as in England. J. J.—*5th Ed.*

their usual course of living, both in food and drink, for a considerable time after arriving on the station; verifying the observation, that—

"Cœlum non animum mutant qui trans mare currunt."

And, although they are fortunately less exposed, in general, to many of those causes which aggravate the effects of inebriety ashore, yet much injury is produced before they see their error.

A very common opinion prevails, even in the profession—and I am not prepared to deny its validity, that during the operation of wine or spirits on the human frame, we are better able to resist the agency of certain morbid causes, as contagion, marsh effluvium, cold, &c. But, let it be remembered, that it is only while *the excitement* lasts, that we can hope for any superior degree of immunity from the said noxious agents; after which, we become doubly disposed towards their reception and operation! Nor am I fully convinced, by all the stories I have heard or read, that *inebriety* has, in any case or emergency, even a *momentary* superiority over *habitual* temperance.

The delusion in respect to vinous and spirituous potations, in hot climates, is kept up chiefly by this circumstance, that their bad effects are, in reality, not so conspicuous as one would expect; and they rather predispose to, and aggravate the various causes of disease resulting from climate, than produce direct indisposition themselves; consequently, superficial observation places their effects to the account of other agents. But the truth is, that as *drunkenness,* in a moral point of view, leads to every vice; so, in a medical point of view, it accelerates the attack, and renders more difficult the cure of every disease, more particularly the diseases of hot climates; because it has a *specific* effect, I may say, on those organs to which the deleterious influence of climate is peculiarly directed. If the Northern inebriate is proverbially subject to hepatic derangement, where the coldness of the atmosphere powerfully counterpoises, by its action on the surface, the internal injury induced by strong drink, how can the Anglo-East or West Indian expect to escape, when the external and internal causes run in perfect unison, and promote each other's effects by a wonderful sympathy.

It has been considered wise, as I before hinted, to take the seasoned European for our model, in every thing that respects our *regime* of the non-naturals. "Strangers," says Mr. Curtis, "arriving in India, if they regard the preservation of health, cannot too soon adopt the modes of living followed by the experienced European residents there." I do not conceive this to be a good medical maxim, even in India, where temperance is scarcely a virtue; and certain I am, that it is a most dangerous precept in the West, for reasons which I have lately rendered sufficiently obvious. It confounds all discrimination between the very different habits of body which the seasoned and unseasoned possess. It is consonant with

experience, as well as theory, that the *former* class may indulge in the luxuries of the table with infinitely less risk than the *latter;* and this should ever be held in view. In short, the nearer we approach to a perfectly *aqueous* regimen in drink, during the first year at least, so much the better chance have we of avoiding sickness; and the more slowly and gradually we deviate from this afterwards, so much the more retentive will we be of that invaluable blessing—HEALTH!

It might appear very reasonable, that in a climate where *ennui* reigns triumphant, and an unaccountable languor pervades both mind and body, we should cheer our drooping spirits with the mirth-inspiring bowl;—a precept which Hafiz has repeatedly enjoined. But Hafiz, though an excellent poet, and, like his predecessor, Homer, a votary of Bacchus, was not much of a physician; and without doubt, his "*liquid ruby,*" as he calls it, is one of the worst of all prescriptions for a "pensive heart." I remember a gentleman at Prince of Wales's Island (Mr. S.), some years ago, who was remarkable for his convivial talents and flow of spirits. The first time I happened to be in a large company with him, I attributed his animation and hilarity to the wine, and expected to see them flag, as is usual, when the first effects of the bottle were passed off; but I was surprised to find them maintain a uniform level, after many younger heroes had bowed to the rosy god. I now contrived to get near him, and enter into conversation, when he disclosed the secret, by assuring me he had drunk nothing but water for many years in India; that, in consequence, his health was excellent—his spirits free—his mental faculties unclouded, although far advanced on time's list; in short, that he could conscientiously recommend the "*antediluvian*" beverage, as he termed it, to every one that sojourned in a tropical climate.

But I am not so *utopian,* as to expect that this salutary example will be generally followed; though it may lead a few to imitate it, till the constitution is naturalized, when the *pleasures of temperance* may probably induce them to persevere. At all events, the new-comer should never exceed three or four glasses of wine after dinner, or, on any account, admit it to his lips between meals, unless excessive fatigue and thirst render drink indispensable, when cold water might be injurious. Spirits, of course, should be utterly proscribed.

One circumstance, however, should always be kept in mind, to wit, that when a course of temperance is fully entered on, no consideration should induce us to commit an occasional debauch, especially during our seasoning; for we are at those times in infinitely greater danger of endemic attacks, than the habitual bacchanal.

It has been remarked, by many sensible observers, that *acids* are injurious to the stomach and bowels between the tropics. I will not contradict, though I cannot confirm this observation. I never saw any bad effects myself from their use; and I know some medical gentlemen, long resident

in India, who drank very freely of sherbet, at all times when thirst was troublesome. Nature seems to point out the vegetable acids, in hot climates, as grateful in allaying drought, and diffusing a coolness from the stomach all over the body. It is very probable, however, that where the alimentary canal is in an irritable state, they may excite diarrhœa; and this last frequently leads to more serious disturbance in the functions of the digestive organs. Where the tone of the stomach, too, is weak (as is often the case), and that organ is disposed to generate acidity, the acids in question may readily prove injurious.

It has also been said, that a too free use of cocoa-nut water, or milk, as it is sometimes called, has produced bowel-complaints. My own observations are not in unison with this remark. It was my favourite beverage, and never did I feel in my own person, or perceive in others, the slightest inconvenience from indulging in this most delicious liquid. It ought, however, to be fresh drawn, limpid, sweet, and never drunk after the deposit on the inside of the shell begins to assume the form of a consistent crust.

I have alluded to the danger of drinking cold fluids when the body is heated, and particularly where perspiration has continued profuse for any time. I could furnish many instances, illustrative of this position, but shall only adduce the following:—

Lieutenant Britton, of the Royal Marines, (at that time belonging to His Majesty's ship Grampus), a very fine young gentleman, had heated and fatigued himself, by driving about the streets and bazaars of Calcutta, in the Autumn of 1803, in which state, he had the imprudence to swallow an ice-cream for the purpose of allaying his thirst. Of the effects of this he died, a few weeks afterwards, on his passage to Madras, under my own care. It brought on inflammation about the fauces, which subsequently spread down along the membrane lining the trachea to the lungs, producing symptoms exactly resembling croup. He died in dreadful agonies, flying from one part of the ship to another, for relief from the dyspnœa and oppression on his chest. Various remedies were tried, but all in vain. Let this prove a caution to the living! "The danger," says Dr. Dewar, "of drinking cold water in that state of the system, was most striking when a copious draught was quickly taken after extraordinary heat and fatigue. An acute pain was instantly produced in the stomach, and rapidly extended through the rest of the body which threatened to overpower the whole vigour of the frame."—*On Dysentery*, p. 50. A navy surgeon died at Marmorice in Asia Minor, after a very short illness, contracted by taking a draught of cold water in a hot state of body. For numerous examples of a similar nature, see Currie's *Medical Reports*.

IV.—Exercise, &c.

This is one of the luxuries of a northern climate, to which we must, in a great measure, bid adieu, between the tropics. The principal object and effect of exercise in the *former* situation, appear to consist in keeping up a proper balance in the circulation—in supporting the functions of the skin, and promoting the various secretions. But perspiration and certain secretions (the biliary for instance) being already in excess, in equatorial regions, *a perseverance* in our customary European exercises, would prove highly injurious, and often does so, by greatly aggravating the natural effects of climate. Nevertheless, as this *excess* very soon leads to debility and *diminished action*, in the functions alluded to, with a corresponding *inequilibrium* of the blood, so it is necessary to counteract these by such active or passive exercise as the climate will admit, *at particular periods of the day or year;* a discrimination imperiously demanded if we mean to preserve our health. Thus, when the sun is near the meridian, for several hours in the day, on the plains of India, not a leaf is seen to move—every animated being retreats under cover—and even the "*adjutant*" (gigantic crane) of Bengal, whose stomach will bear an ounce of emetic-tartar without complaining, soars out of the reach of the earth's reflected heat, and either perches on the highest pinnacles of lofty buildings, or hovers in the upper regions of the air, a scarcely discernible speck. At this time the Hindoo retires, as it were instinctively, to the innermost apartment of his humble shed, where both light and heat are excluded. There he sits quietly, in the midst of his family, regaling himself with cold water or sherbet, while a mild, but pretty copious perspiration flows from every pore, and contributes powerfully to his refrigeration.*

As soon as the cool of the evening, however, commences, all Nature becomes suddenly renovated, and both men and animals swarm in myriads from their respective haunts! Then it is that the esplanade at Calcutta, and the Mount road near Madras, pour on the astonished eye of the stranger a vast assemblage of all nations, castes, and complexions, comprehending an endless and unequalled variety of costume and character, hurrying to and fro, in all kinds of vehicles as well as on foot, enjoying the refreshing air of the evening! The same scene is witnessed early in the morning, particularly during the cool season, in Bengal; but in the rainy season there, and while the hot land-winds prevail on the Coromandel coast, the life of an European is irksome to the last degree! Perspiration being then

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* What with the smoke of the house (for there is no chimney) and the oil on his skin, a native is hardly ever annoyed by mosquittoes, as foreigners are.

profuse, the most trifling exertion is followed by languor and lassitude. Cooped up behind a *tatty*, or lolling under a *punka*, he can neither amuse his mind, nor exercise his body, and *tædium vitæ* reigns uncontrolled during these gloomy periods! It need hardly be urged, how injurious active exercises would be to Europeans, at such times; or, indeed, during the heat of the day, at any time. Yet hundreds annually perish from this very cause; particularly in the West Indies, after each influx of Europeans during war!

Who would expect to find *dancing* a prominent amusement in a tropical climate? The natives of the West Indies are excessively fond of this exercise; but in the East there are *wise men* still, for instead of dancing themselves, they employ the *nautch-girls* to dance for them.

It might seem ill-natured if I animadverted on the custom of my fair countrywomen, who *shew off* with such eclat, at the *Pantheon* in Madras, regardless of all thermometrical indications. The practice is not *salutary*, however *politic* it may be found—and it certainly does not *appear* to agree so well with *married* ladies as with *virgins*, whatever may be the reason.

I have shewn that the range of atmospherical heat is considerably higher in the East than in the West, and that in the latter part of the world they are exempted from hot land-winds, and more favoured with cool sea-breezes, than the inhabitants of the former. Still, Europeans, although they may not enjoy better health, experience infinitely less mortality in the peninsula of India, than in the West Indian Archipelago. If a thousand European troops, for instance, are debarked at Kingston, Jamaica, and an equal number at Madras, at the same time, we shall find the former lose, in all probability, one-third—perhaps one-half their number, during the first eighteen months: while the other corps will not lose more than a thirtieth or a fortieth part of their total, in the same period. But if we examine the two bodies of men at the end of five or six years, we shall not find the same disproportion. Hepatic and dysenteric complaints, by that time, will have brought the Eastern corps, somewhat nearer a *par* with their Western countrymen. The great *onus* of disease bears on the *first year* of a European's residence in the West Indies, because that is the period within which the endemic or yellow fever makes its attack; after which, he feels the effects of climate in a more moderate degree.—In the East, fever (excepting in Bengal) is by no means general; and the first year is not distinguished by mortality. But the climate being much hotter, and the atmospherical vicissitudes more sudden and extensive, each subsequent year produces great mischief in important organs; and the wonder is, why he does not suffer infinitely more than the Anglo-West-Indian!

I have already adduced several causes for this disparity (vide pages 78-9, &c.); one, the greater length of an East India voyage, with its concomitant abstemious regimen, the reverse of which so much predisposes to the violent assaults of the Western endemic. Another, is the laudable

temperance and decorum, prescribed by general custom in the Eastern world, obviating, in no slight degree, the deleterious influence of climate. I shall now proceed to make some observations on other differences in the modes of life, and means of preserving health in the two countries, as elucidatory of this subject, hoping that the interest and utility of the discussion will sufficiently excuse its informal position in this section.

First, then, the HOUSES of the East, whether permanent mansions or temporary *bungalows*, are better calculated for counteracting the heat of the atmosphere than those of the West. As there is no dread of earthquakes or hurricanes in the former place, the dwellings are *solid*—the apartments lofty—the windows large, and the floors, in general, composed of *tarras*, which, being often sprinkled with water, is cool to the feet, and diffuses an agreeable refrigeration through the room. Add to this, that the spacious *verendahs* ward off the glare of the sun and *reflected* heat (an important consideration) by day, and afford a most pleasant retreat in the evening, for enjoying the cool air. The *tatties*, which are affixed to the doors and other apertures, in the hot season, and kept constantly wet by *bheesties*, or water-carriers, whereby the breeze is cooled by evaporation, in its passage through the humid grass, of which the tatty is constructed, prove a very salutary and grateful defence against the hot land-winds ; since this simple expedient makes a difference of twenty or thirty degrees, between the *bheesty's* and the *European's* side of the *tatty !* It appears, however, that in the East we have not been sufficiently attentive to the prevention of *reflected heat and glare;* a circumstance of infinitely greater consequence than the freest ventilation. Let us learn from the native. His habitation has very few apertures, and those high up. His floor, and the inside of the walls, are moistened two or three times a day with *a solution of cowdung in water*, which, however disagreeable to the olfactories of an European, keeps the interior of the dwelling as cool as it is dark. Here he sits on his mat, enjoying his aqueous, but salutary beverage; and with such simple means and materials, counteracts the heat of the climate more effectually than the European in his superb and costly edifice. " Those who live in houses," says Dr. Winterbottom, " the walls of which are plastered with mud, frequently, during the continuance of hot weather, wet the walls and floor to cool the air ; this is a very *hurtful* practice, as it renders the air *moist*, and brings it nearly into the state it is in during the rainy seasons." —*On Hot Climates, p.* 16. This, like many other observations founded on *contracted* views and favourite theories, is completely contradicted by the broad basis of facts. It reminds us of a passage in Dr. Robertson's third volume on the Diseases of Seamen, where he undertakes to prove, that it is the *moisture* of the air over marshes that causes disease; and, in short, questions whether *miasmata* ever produced fever—*except on board the* WEAZLE *sloop of war, when he was surgeon of her, on the coast of Africa ! !*

The upper classes of natives, also, have not been inattentive to the prevention of reflected heat. The houses of Benares, for instance, are of solid stone, and generally six stories high, with small windows. The streets are so extremely narrow, that the sun has very little access to them; obviating thereby the disagreeable effects of glare. The windows are small, because, from the height of the houses, it would be impracticable to apply tatties during the hot winds: whereas, in low country-houses, or bungalows, they are large, in order to extend the refrigerating influence of the tatties.

The dazzling whiteness of European houses in India is not only inconvenient, but in some degree injurious, to the eyes, at least; and a verendah, entirely encompassing the mansion, would contribute greatly to the refrigeration of the interior apartments; the most comfortable of which, by the bye, on the ground floor, used to be appropriated to the use of palankeens and lumbar, but are now wisely converted into offices, &c.

The *punka*, suspended from the lofty ceilings of the Eastern rooms, and kept waving overhead, especially during our repasts, is a very *necessary* piece of what may be fastidiously styled "Asiatic luxury." Indeed, were it not for this and the *tatty*, some parts of India would be scarcely habitable by Europeans, at certain seasons.

It is observed, in a recent "Account of Jamaica," by a gentleman long resident there, that the "*Asiatic effeminacy* of being carried about in a palankeen, has not yet reached the West Indies." It would be well if several other Asiatic effeminacies (temperance for example) were more generally adopted in the transatlantic islands. But that the Anglo-West-Indian rejects this luxurious vehicle, *merely* through any scruple respecting its *effeminacy*, is rather too much for credence. If a dozen of sturdy *Balasore-bearers* could be hired in Jamaica for the trifling sum of four or five shillings a day, including all expenses, the Western Nabob and Nabobess would soon condescend to recline in the palankeens, with as much state as their "*effeminate*" brethren of the East. But the plain reason is, that neither the country itself nor its *imported* population will admit of a conveyance which is cheap, elegant, and convenient, on the salutary plains of India.*

Gestation in a palankeen, however, is a species of passive exercise exceedingly well adapted to a tropical climate. The languid circulation of the blood in those who have been long resident there, is pointedly evinced by the inclination which every one feels for raising the lower extremities on a parallel with the body, when at rest; and this object is completely

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* Cheeks of kuss-kuss, a sort of grass, of which the *tatties* are made, being affixed to the doors of palankeens, and kept moist, enable Europeans to travel during the hottest weather. A wet *palampore*, or covering of calico, is a tolerable substitute.

attained in the palankeen, which indeed renders it a peculiarly agreeable vehicle. On the same principle we may explain the pleasure and the utility of *shampooing*, where the gentle pressure and friction of a soft hand, over the surface of the body, but particularly the limbs, invigorate the circulation after fatigue, and excite the insensible cuticular secretion. I much wonder that the *swing* is not more used between the tropics. In chronic derangements of the viscera it must be salutary, by its tendency to determine to the surface, and relax the sub-cutaneous vessels, which are generally torpid in those diseases. It might be practised in the evenings and mornings—and within doors, when the state of the weather, or other circumstances, did not permit gestation, or active exercise in the open air.

A propensity towards *smoking* would not be expected, *á priori*, in a tropical climate. Yet the practice is very general among Europeans and Natives, and seems to spring from that listlessness and want of mental energy, so predominant in the character both of sojourners and permanent inhabitants of sultry latitudes. As the custom may not be insalutary at certain seasons of the year, in particular places, where marshy or other deleterious exhalations abound; and, as it is often a succedaneum for more dangerous indulgences, it is best, perhaps, to pass it over with little comment. Yet it has ever appeared to me a degrading habit, for a gentleman to become a *slave* to his hookah; and it is beyond endurance, to see a great, lusty *hookah-burdaar*, insinuate the pipe of his long *snake* into the delicate hand of a European lady, after dinner, who plies the machine with as much glee, as the sable and subordinate nymph of the country does her *nereaul!* For the honour and delicacy of the sex, this practice is by no means common; and the wonder is, that it ever should have existed.

In the article of *dress*, the Anglo-East-Indians have a manifest advantage over those of the West. The delicious and salutary beverage of *cool drink*, too, is more in use among the former than the latter; partly owing to custom, and partly to opulence, which enables all ranks of Europeans to have their wine, water, &c. refrigerated with saltpetre, by a particular servant, set apart for that sole purpose, and called in Bengal—*Aub-daar*. The effect of these gelid potations on the stomach is diffused from thence, by sympathy, over the whole frame, but especially over the external surface of the body, counteracting in no mean degree, the natural influence of the climate. It is true, the bottles are brought on table in the West Indies, enveloped in wetted napkins; but the effect is far inferior to that produced by the nitrous solution; and as the aubdaar's art is extended to all kinds of drink, this grateful luxury is ever at hand.

V.—Bathing.

"I DARE not," says Dr. Moseley, "recommend cold bathing (in the West Indies); it is death with intemperance, and dangerous where there is any fault in the viscera. It is a luxury denied to *almost all*, except the sober and abstemious females, who well know the delight and advantage of it."—3d ed. p. 90. In respect to its being "death with intemperance," I believe that numerous inebriates could tell the doctor a different story; but as, it is presumed, he never deigns to look into a modern author, he is unacquainted with various facts that militate against his dogma. The well-known instance of Mr. Weeks, of Jamaica, who always went to sleep in cold water, when intoxicated, is sufficiently in point. Many a time have I seen it bring the drunken sailor to his senses at once; and *invariably* have I observed it to moderate the excitement of spirituous potations. I knew a gentleman who always went to sleep with his head on a *wet swab*, whenever he had taken a good "*mosquitto dose;*" and the consequence was, that he very seldom complained of headache next day. It is true, that if the cold bath be injudiciously used, during the indirect debility *succeeding* a debauch, there may not be sufficient energy in the constitution to bring on re-action; and then, of course, it would be injurious. But this is a discrimination to which the genius of a Moseley could not stoop. Granting, however, what is certainly true, that the cold bath is dangerous, where visceral obstructions obtain, I cannot conceive why it should be denied to *almost all*, except females, in hot climates; unless we take those visceral derangements with us from Europe. Surely we might be allowed "the delight and advantage" of it, till these disordered states occur!

But whatever *theory* may have discouraged bathing, and recommended the use of "gently stimulating liquids," in the West; wide *experience* has completely settled these points, long ago, in the East. There, the Native and European—the old and the young—the male and the female, resort to the BATH, as the greatest luxury, and the best preservative of health. In truth, it is one of the most powerful engines we possess, for counteracting the destructive influence of a hot climate, because it connects the most grateful sensations with the most salutary effects—it is induced both *utile et dulce*.

Nature, or instinct itself, points out the external application of cold water to the body, to moderate the action of atmospheric heat. The buffalo is a familiar example. In the middle or hot period of the day, these animals repair to pools or marshes, and, wading in, either stand or lie down there, with every part except the nose immersed in water; or, where there is not water, in the mud. At these times, by the bye, it is very dangerous

for Europeans to approach their haunts. They generally start up all at once, on being disturbed; and if one or two begin to snort and advance, the European is in imminent peril: nothing but the most rapid retreat to a place of safety can secure his life. A red coat is a very unfortunate dress at such critical rencontres, as the animals in question have a decided antipathy to that colour.

It requires but little penetration to see, that the Brahminical injunctions, relating to ablutions, were founded on the preservation of *present* health to the body; though the *future* happiness of the soul was artfully held out as a superior inducement to the performance of these ceremonies, so necessary beneath a burning sky. The superstitious Hindoo rarely omits bathing, once or oftener every day, in the sacred stream of the Ganges (or other consecrated river), from which he is not deterred even by the voracious alligator, who frequently carries him off in the religious act! He generally wades out to a moderate depth—then, shutting his eyes, and putting his fingers in his ears, he squats himself under water two or three times,—washes his *doty*—and returns, cool and contented to his humble cot.

The Europeans and upper classes of Mahomedans, however, feeling no great desire for risking *téte-a-tétes* with sharks or alligators, are, in general, satisfied with a few pots of cold water thrown over their heads at home, once, twice, or oftener every day, according to the season of the year, and the person's own inclinations. This, being unattended either with fatigue or expense, is well adapted to all circumstances and situations, and answers the end in view effectually enough.

I have shewn, in various parts of this essay, that most of the diseases of tropical climates are attributable to *atmospherical vicissitudes*. Now, there is nothing that steels the human frame, with more certainty, against the effects of these, than the cold bath. We are the very creatures of habit; and, consequently, *habituation* is the surest prophylactic. The cold bath not only counteracts the influence of heat, by suspending its operation for the time, but it safely inures us to the sudden application of cold, the fruitful source of so many disorders. By keeping the skin clean, cool, and soft, it moderates excessive, and supports a natural and equable cuticular discharge; and, from the "*cutaneo-hepatic sympathy*," so often noticed, the functions of the liver partake of this salutary equilibrium—a circumstance hitherto overlooked.—The use of the *cold bath*, then, should be regularly and daily persevered in, from the moment we enter the tropics; and when, from long residence there, the functions above alluded to begin to be irregular and defective, instead of in excess, we may prudently veer round, by degrees, to the *tepid bath*, which will be found a most valuable part of Tropical Hygiene among the *seasoned* Europeans.

As the cold bath is passive, (for it is seldom that the exhausting exer-

tion of swimming accompanies it) so it may be used at any period of the day; though the mornings and evenings are generally selected by Europeans in the East; immediately after leaving their couch, and before dinner. The bath is very refreshing, when we rise unrecruited from a bad night's rest; and powerfully obviates that train of nervous symptoms, so universally complained of by our countrymen between the tropics. Before dinner it is salutary, apparently from that connexion which subsists between the external surface and the stomach, in consequence of which the tone of the latter is increased, and the disagreeable sensation of thirst removed, that might otherwise induce to too much potation during the repast.—It is, however, imprudent to bathe while the process of digestion is going on in the stomach, as it disturbs that important operation. Where visceral derangements of any extent, particularly in the liver, have taken place, the cold bath must be hazardous, from the sudden afflux of blood directed from the surface to the interior, and also on account of the subsequent vascular re-action. The tepid bath, taking care to avoid a chill afterwards, will, in these cases, be substituted with great advantage.

VI.—Sleep.

When we bid adieu to the temperate skies of Europe, with all its "long nights of revelry," and enter the tropics, particularly in the Eastern hemisphere, we may calculate on a great falling off in this "solace of our woes." The disturbed repose, which we almost always experience there, has a greater influence on our constitutions than is generally imagined, notwithstanding the silence of authors on this subject. Nature will not be cozened with impunity. Whatever we detract from the period of our natural sleep, will assuredly be deducted, in the end, from the natural range of our existence, independently of the predisposition to disease, which is thus perpetually generated. This is a melancholy reflection; but it is truth, and it should induce us to exert our rational faculties in obviating the evil.

When the sun withdraws his beams, and the intense heat of the atmosphere is mitigated, we might expect a comfortable interval of repose —but this would be a vain hope. A new host of foes instantly appear in arms to annoy us! Mosquitoes, ants, and cock-roaches, lead on the insect tribes—the bat wheels in aerial circuits over our heads, on which he sometimes condescends to alight, without ceremony—while the snake patroles about in the purlieus of our apartment; coils himself up under our

beds, or even deigns to become our *bedfellow* without waiting the formality of an invitation.*

The great object of an European is to *sleep cool*. This enables him to procure more rest than he otherwise could do; and, by giving his frame a respite, as it were, from the great stimulus of heat, imparts to it a tone and vigour—or, as Dr. Darwin would say, "an accumulation of excitability," so necessary to meet the exhaustion of the ensuing day, as well as to repair that of the preceding.

A great waste of strength—indeed, of life, arises from our inability, on many accounts, to obtain this *cool* repose at night. Thus rains, heavy dews, or exhalations from contiguous marshes, woods or jungles, often render it unsafe or impossible to *sleep in the open air;* a practice fraught with the most beneficial consequences, where the abovementioned obstacles do not prevent its execution. But, pending the hot and dry season in Bengal, and almost always on the Coromandel coast, except during the hot land-winds, or at the change of the monsoons, we may indulge, not only with safety, but with infinite advantage, in the seemingly dangerous luxury of sleeping abroad in the open air.

I am well aware of the prejudices entertained against this custom, by great numbers, both in and out of the profession; but I am convinced, from personal experience and observation, that the practice, under the specified restrictions, is highly salutary, and I know it is sanctioned by some of the best-informed veterans, who have spent most part of their lives between the tropics. Speaking on this subject, the judicious Captain Williamson remarks that—"few, very few instances could be adduced, of any serious indisposition having attended it; while, on the other hand, it is confessed by all who have adopted it, that the greatest refreshment has ever resulted; enabling them to rise early, divested of that most distressing lassitude, attendant upon sleeping in an apartment absolutely communicating a febrile sensation, and peculiarly oppressive to the lungs."—*East India Vade-Mecum.*

If it be observed, that I have all along held up to view the danger of atmospherical vicissitudes to which this practice would *apparently* expose us; I answer, that I have also maintained, that *early habituation* to these, was the surest preservative against their injurious effects, as exemplified in the use of the bath. The truth is, however, that while the custom of

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* Many instances have occurred of snakes being found coiled away between children in bed. It is said, that if a chafing-dish, filled with clear, live embers, be quietly placed on the floor of a room, in such emergency, the reptiles will repair to it; especially if some new milk be also left near the chafing-dish.—Great presence of mind is here necessary, in order not to disturb those dangerous creatures suddenly in their retreat.

sleeping in the open air steels the human frame against these same effects, it is, in reality, attended with less exposure to *sudden atmospherical transitions* than the opposite plan. Nature is ever indulgent, when we observe her ways and obey her dictates. Excepting the periods and places alluded to, the *transition in the open air*, from the scorching heat of the day to the cool serenity of night, is gradual and easy. To this the human frame bends with safety, and we sink into a grateful and sound sleep, that renovates every corporeal and mental faculty. Whereas, those who exclude themselves from the breath of heaven, whether from necessity or inclination, become languid, from the *continued* operation of heat and the want of repose; in consequence of which, the slightest aerial vicissitude (either from leaving their couch, or admitting a partial current of cool air, which they are often compelled to do) unhinges the tenor of their health, and deranges the functions of important organs! These are they who require the afternoon *siesta*, and to whom, indeed, it is necessary, on account of the abridged refreshment and sleep of the night; while the others are able to go through the avocations of the day without any such substitute—a great and manifest advantage.

Indigenous custom is, generally speaking, in favour of sleeping in the open air, during the hot seasons, in most Eastern countries. The practice, indeed, is less adopted in Bengal, for very obvious reasons, than on the Coromandel coast; but the native sleeps much cooler, at all times, than the European, from this circumstance—that his bed seldom consists of more than a *mat*, while a piece of *calico* wrapped round him supplies the place of bed-clothes. The more closely we imitate these the better will it be for us. Indeed, a thin hair mattress, with a sheet and palampore, are the only requisites, independently of the thin gauze or mosquito curtains, which defends us from insects, and, when we sleep out on the *chabootah*, arrest any particles of moisture that may be floating in the atmosphere. Early hours are here indispensable. The fashionable nocturnal dissipation of Europe would soon cut the thread of our existence between the tropics. The order of nature is never inverted with impunity, in the most temperate climates; beneath the torrid zone it is certain destruction. The hour of retirement to repose should never be protracted beyond ten o'clock; and at day light we should start from our couch to enjoy the cool, the fragrant, and salubrious breath of morn.

We shall conclude this section with a few remarks on incubus, or night-mare—a very troublesome visitor to a tropical couch.

The *proximate cause* of incubus has given rise to various speculations. A very general opinion prevails, that this affection is produced by mechanical obstruction to the blood's circulation, from particular position of the body. It is a certain fact, however, that no posture is a security from night-mare among the predisposed; neither is a full stomach to be accused as the cause, nor an empty one to be expected as the antidote of this dis-

order. There is, however, an almost universal opinion, that incubus attacks persons *only* while on their backs! and this opinion *seems* to have some foundation in fact, from the following circumstances. One of the symptoms almost inseparable from the disease is this, that the patient *appears to himself* to be kept down upon the back by some external force; and as, at the moment of recovering the power of volition, a great confusion of ideas prevails, a person may easily imagine that he has recovered himself by some effort of his own, by turning from his back to his side. But these things are extremely fallacious, as there is no trusting to the senses during a paroxysm of incubus.

It appears, however, from the mode of treatment to which this disease gives way, that the primary cause, in whatever manner it may act, has its seat in the digestive organs, and the night-mare originates in defective digestion, whereby the food, which should be converted into good chyle, is transformed into a half-digested mass of *acid* matter, which is productive of heart-burn, eructations, flatulence, gripes, with the whole train of dyspeptic and hypochondriacal complaints.

There are many stomachs which convert every thing they receive instantly into an acid; and such will be generally found to be the case with persons subject to habitual night-mare, or frightful dreams and disturbed sleep. Such stomachs are too frequently distended with some acid gas, which alone gives rise, in many cases, to paroxysms of incubus; and may often be instantly removed by any warm cordial, as peppermint, gin, brandy, carbonate of ammonia, &c. Whytt used generally to take a small wine-glassfull of brandy going to bed, in order to keep off night-mare and terrific dreams, to which he was very subject.

Of all medicines, however, the carbonate of soda, taken in a little ale or porter, as recommended by Mr. Waller, will be found the most efficacious. About a scruple, going to bed, is a sufficient dose; and where acidities prevail in the stomach, the same quantity, twice in the day, will be useful. This medicine not only neutralizes any acid in the first passages, but likewise brings away by stool vast quantities of viscid slimy matter, so acrid as to burn and excoriate the parts it touches. The appetite now generally improves; but the propensity to acidify remains for a long time in the stomach, and requires great attention to diet and regimen. There are few people with whom particular kinds of food do not disagree, and these, being known, should be avoided. Thus chesnuts or sour wine will almost always produce incubus among those predisposed to it, as was observed by Hildanus. "*Qui scire cupit quid sit Incubus? Is ante somnum comedat casteneas, et superbibat vinum fæculentum.*" In this country, cucumbers, nuts, apples, and flatulent kinds of food, are the articles most likely to bring on night-mare.

The following draught I have found very efficacious in preventing attacks of incubus, viz. carbonate of ammonia, ten grains, compound tinc-

ture of cardamoms, three drachms, cinnamon water, two ounces, to be taken going to bed.

Intemperance of any kind is hurtful. Most vegetables disagree; and pastry, fat, greasy, and salted meat, are to be avoided. Moderate exercise is as beneficial, as sedentary employments, intense study, and late hours are prejudicial.

VII.—The Passions.

I have not yet alluded to the conduct of the Passions, because most of the precepts that apply to the regulation of them in cold climates, will be equally applicable here. But I may be permitted to correct an erroneous (I think), though very general opinion, that there is something peculiar in a tropical climate, which excites certain passions in a higher degree than in temperate regions. "There is," says Dr. Moseley, "in the inhabitants of hot climates, unless present sickness has an absolute control over the body, *a promptitude and bias to pleasure*, and an alienation from serious thought and deep reflection. The brilliancy of the skies and the beauty of the atmosphere conspire to influence the nerves against Philosophy and her frigid tenets, and forbid their practice among the children of the sun."—p. 87. This is a very superficial, and a very false view of the affair. It is, likewise, a very immoral one; for it furnishes the dissolute libertine with a *physical* excuse for his debaucheries, when the real source may be traced to a relaxation of religious and moral principles! I would ask Dr. Moseley to explain the reason why, if the "*promptitude* to pleasure" be increased in a hot climate, the *ability* to pursue or practise it should be lessened?—a truth well known to every debauchee.

If the prevalence of polygamy in warm climates be adduced, I answer that, in countries where plurality of women is allowed, a minute and accurate investigation will shew, that, among the lower orders of people, the licence of the prophet is an empty compliment, for *they* find one wife quite enough. And as for the *higher ranks* of society, there is not *one in twenty* who has more than one wife, nor one in five hundred who has more than two. If we compare this last part of the statement with the picture of life in the *beau monde* at home, we shall not have much reason to congratulate ourselves on the great *physical continence* resulting from our gloomy skies, as contrasted with the "bias to pleasure" which springs from levity of atmosphere between the tropics.

May we not attribute the premature decay of native women in hot climates to the long-established custom of early marriages in that sex, originally introduced by the despotism of man, but which has now effected

an actual degeneracy in the female part of the creation? "It is a disgrace to a woman not to be married before twenty years of age; and we often see wives, with children at their breasts, as soon as they enter their teens." I have no doubt that, to the continued operation of this cause, through a long series of centuries, is owing the deterioration in question; for it is not conformable to the known wisdom of the Creator, that such an inequality should *naturally* exist between the sexes.

But to return. The removal of religious and moral restraint—the temptations to vice—the facility of the means, and the force of example, are the real causes of this "bias to pleasure;" and in respect to the *effects* of licentious indulgences between the tropics, I can assure my reader that he will find, probably when it is too late, how much more dangerous and destructive they are than in Europe.

He now has explained to him the nature of this "propensity;" and, as the principal cause resides neither in the air, nor the "brilliancy of the skies," but in his own breast, he has no excuse for permitting it to sprout into the wild luxuriance of unbridled excess.

The monotony of life, and the apathy of mind, so conspicuous among Europeans in hot climates, together with the obstacles to matrimony, too often lead to vicious and immoral connexions with native females, which speedily sap the foundation of principles imbibed in early youth, and involve a train of consequences, not seldom embarrassing, if not embittering every subsequent period of life! It is here that a taste for some of the more refined and elegant species of literature will prove an invaluable acquisition for dispelling *ennui*, the moth of mind and body.

J. J.

VIII.—On the Prevention of Disease.

On the important matter of prophylaxis nothing new can be urged, as the chief means of prevention of disease are present to the common sense of most nations to a certain degree, if they only choose to act upon them. But there is one circumstance which ought to be impressed every where on the public, and it is, that however useful medicine may be in moderate and judiciously administered doses, under occasional circumstances of change of season, or during certain epidemics, it is yet more on the proper selection of localities, the avoidance of day and night exposure, care in diet, exercise, clothing, &c. ;—in short, on the adoption of all those well-known measures of avoidance, whether affecting individual habit of life, or those more general predisposing causes of disease now so well understood, that disease is to be prevented, and not by a system of self-quackery, with calomel and other mercurial preparations, such as many persons pursue in this country to their great injury, for the removal of what they call "*biliousness.*"

Many is the strong habit I have seen impaired by this senseless custom; and I have known several lives lost, and others put in jeopardy by the use of saline purgatives during seasons of cholera. Dr. Paris assures us that, "if the truth were told, a large portion of dyspeptics seek the advice of a physician not so much for the adjustment and better regulation of their diet as for the means by which they may counteract the ill effects of their indulgences—hence the popularity of those "*antibilious*" remedies, which promise to take the sting out of their excesses and to enable the unhappy dupes to fondle and play with vice as with a charmed serpent."

Ingenuity, says Copland, cannot possibly devise a more successful method of converting a healthy person into a confirmed invalid, of destroying many of the comforts of existence, and of occasioning hypochondriasis and melancholy, than the practice of prescribing large doses of calomel on every trifling occasion, or when the bowels require gentle assistance; or because the patient erroneously supposes himself to be *bilious,* or is told so by those who should know better.

The same distinguished writer ascribes the lapse of occasional indigestion into confirmed stricture of the rectum, and of hæmorrhoids into fistulæ, to the frequent and injudicious use of calomel for the removal of mere occasional derangements of health. The unfortunate word "bilious," as applied to slight disorders, is the scape-goat of the ignorant.

Another extensive source of disordered health I must here mention, as it has come frequently under my notice ;—I mean the long continued use of aperient medicines containing the mercurial preparations. It is common for patients to obtain from their physicians aperient pills, for instance,

containing some portion of calomel, or blue pill. This may have been given with a particular view, or for an especial occasion only; but it often happens that the patient continues for months, and even for years, that which was intended to be used but for days, or weeks. The results are very lamentable. I have seen persons in a state of nervous irritability bordering upon insanity, from this cause, with a sub-acute inflammation of the mucous digestive surface, and chronic ptyalism—all resulting from the long continued, and frequently unconscious use of mercury.

One field officer used blue pill and colocynth for two years and a half; and an American gentleman took the same preparation with ipecacuanha, during a voyage from a sister presidency to America, and back to Calcutta. It is needless to detail how ruined were the healths of both.

The inferior wines imported into Calcutta and the other presidencies, under the *names* of the finest vintages of France, and used at the tables of European residents, is a fruitful source of various disorders of the digestive organs, occasionally terminating in actual disease. French gooseberry wine, passed off as Champaign, and the vilest Clarets under the names of the first growths, as Lafitte, Chateau-Margaux, and Latour, are continually selling at prices so low as at once to stamp them sophisticated.

The public is itself to blame in this matter. Most persons are in settled positions, and it is no great trouble, one would think, to order these and other requisite supplies from Europe. Such as are negligent, or wish to practise economy at the expense of their stomachs, may then continue to use the market wines. Of wine it has been remarked by sportsmen that it may injure by disordering the stomach, or the head. "Good wine," they say, "does the latter alone: bad wine both."

In speaking of the means of preserving health, which depends so much on the tone of the digestive organs, I must not omit the new luxury, the American ice—which I hope soon to see becoming an article of necessity amongst us. It would be out of place to speak here of its use in the treatment of various diseases, and of fevers—especially those of a gastric nature. I shall therefore simply express my entire accordance with Dolomieu. Nothing, he says, is more salutary during the Sirocco than iced beverages; they revive the spirits, strengthen the body, and assist the digestion. Such as have used this luxury in Calcutta during the hot season and rains, need no arguments in promotion of so remarkable an instance of American commercial enterprise.

The admirable rules prescribed by Johnson regarding dress, food, drink, exercise, sleep, bathing, &c. &c., and the regulation of the passions, are well known; but perhaps better known than regarded: they are like the vital points in religion and morals;—all men agree in them;—yet how easily are they forgotton! In order to think seriously on health, most men require to suffer from disease: the lessons derived from such experience are longest remembered.

It is a remarkable fact, and one often observed, that most diseases, in malarious countries especially, and where vicissitudes are great, have their origin in *night* exposure; but I believe the reason has only lately been rightly explained by Dr. W. F. Edwards.

"During natural sleep," he says, "there is a diminution in the power of producing heat, and this explains why a damp cold air, or a dry and piercing air, which is borne without inconvenience while the individual is awake, even without the aid of exercise, may be hurtful during sleep." Speaking of the yellow fever, Dr. William Fergusson says, "it is my belief that malaria can only prevail upon the body during the passive state of sleep; in fact, that to sleep is the danger." It may be remarked in addition, that the effect of exposure to cold during sleep, must necessarily vary according to the power of producing heat. As a means of guarding the system against the effects of atmospheric vicissitudes, I know of none more influential than the cold bath, provided always that the subject be temperate in habits, and healthy.

On the prevention of disease, as applied to troops, I cannot do better than quote the sensible observations of Dr. Hennen, who, speaking of the value of medicines, says, he does not question their proper use in the cases of reflecting individuals; "but I do not hesitate to say, first, that they cannot be generally applicable to a whole corps or garrison. Secondly, that although the soldier may submit in passive obedience, he will invariably make himself amends (as he supposes) for the restriction, by subsequent excess of one kind or other; and, thirdly, although military officers are sufficiently enamoured of any favourite theory originating with themselves, they view the proposals of medical men but too often with a jealous eye, especially when the advantages to be derived from them are merely prospective. We possess the power, by means of the established medical inspections, to meet the approaching disease as early as possible, but I question the prudence (in a military point of view) of anticipating it before its arrival by a general administration of medicine throughout the garrison; because, nearly thirty years' experience has convinced me that no power on earth will reconcile British soldiers to taking physic en masse, when they are not sick, nor will they ever view the man who orders it in any other light than that of a speculative experimentalist. The true preventives to disease are shelter from the heat of the day and from the dews and cold of night, avoiding the neighbourhood of marshes and other unhealthy spots in military exercises, mounting guards at such an hour that the least possible number of fatigue-parties may be employed in conveying dinners, &c.; timing duties in such a way that the men may enjoy their natural sleep, regulating the messes so that the soldier shall always have a due proportion of vegetables, and especially a comfortable breakfast before going on duty in the mornings; furnishing every

man with flannel waistcoats, or cotton shirts,* enforcing personal cleanliness by frequent bathing, and by daily washing the feet, &c. but, above all, regulating the canteen, so that access can be had to liquor only in the evening, and then taking every precaution that the bad spirits and sour wine of the country be rigidly withheld. We may refine as much as we choose, and we may modify our plans according to circumstances with critical precision, but these are the basis upon which health is founded so far as the soldier is individually concerned."

The unnecessary and vexatious restrictions on the soldier's freedom of action, such as we constantly observe in garrisons and cantonments in India, are irksome to his mind and injurious to his health. He should be allowed to do for himself whatever he can do without prejudice to health or discipline; and this should be made a matter of regulation, not depending, as now, on the mere will or the uncertain notions of individuals.

"It is easy to conceive," says Pringle, "that the prevention of disease cannot depend on the use of medicines, nor upon any thing which a soldier shall have in his power to neglect, but upon such orders as he himself shall not think unreasonable, and such as he must necessarily obey." Of the ill effects of crowding, and want of ventilation in the old General Hospitals, we have a shocking illustration from the same great authority:—"Among the chief causes of sickness and mortality in an army, the reader will little expect that I should rank the hospitals themselves, though intended for its health and preservation, and that on account of the bad air and other inconveniences attending them."—Dr. Robert Jackson is equally emphatic on this head; but it is hoped we shall never again see the bane of general hospitals inflict our armies; for the physical ills they produced, by generating new diseases, tending to fatal relapses, and counteracting recovery, were not surpassed by their moral ills, which went to destroy the best feelings of the man, and by consequence, the best qualities of the soldier.

The flannel is a debatable question with military surgeons; and Dr. William Fergusson considers it only required for the bivouac. As an article of ordinary wear, he says, it is one of which the healthy, hardy soldier (and there ought to be no others in the army) can never stand in need.

The recommendations of this distinguished officer are worthy of attention on another important point—the night-covering and accommodation of the soldier. He urges, that in every part of the British Empire the men should sleep in separate hammocks, which are cool, soft, and elastic, and can be washed like a garment, while they cannot be used without raising the body off the ground, or the hard boards, and they require no aid from flocks or

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* During the hot and rainy seasons in Bengal, the suit should be changed after exercise, and friction with a dry cloth used at the time of changing. The bedding should also be daily exposed to the sun.

straw to make the occupant comfortable, an additional blanket in a cold climate being all that is necessary.

The hammock-railings have the great advantage of preserving freedom of ventilation, even during the night, and of being altogether out of the way during the day.

Wherever a couple of stakes can be driven into the ground, it will serve all the abovementioned purposes in the bivouac.

The erection of hammock-railings, consisting of uprights with cross-posts and hooks, would be as simple as it is economical.

IX.—On the Effects of Change of Air and Locality on Sick and Convalescents.

This subject has not met with the attention it deserves, from writers on the diseases of hot climates especially; but it is one of high importance, to the tropical practitioner, and proper to the objects of this memoir.

He who has witnessed the surprising effects of change of locality on the sick of an army in full march, and that frequently under disadvantages as to ease and comfort which would lead the inexperienced to form the most gloomy prognostics, will agree with me in viewing change of locality as tantamount to a transition from almost hopeless disease to rapid recovery, in many forms of fever and other diseases.

When we see the patient worn out from recurrences of malarious fever, and the treatment directed to its removal, yet suffering a daily or other periodical accession, amounting in the latter stages only to dryness and slight warmth of skin, followed by restless nights; then it is that the immediate and astonishing effects of change are shewn; and how many a poor soldier dies annually throughout the crowded hospitals of India for the want of it; indeed, I might add that, many a patient in civil life is allowed to die in our ports that might be saved by a timely removal to sea or other situation.

"In India," says Sir James Macgrigor, "when patients whose condition in life permits them to take a voyage to Europe are in this state (meaning diseased liver) they never fail to take it, and most commonly are recovered by it; but there is no hope for the poor soldier or sailor."

Dr. James Johnson, speaking of sufferers from repeated tropical dysentery, says—"They waste away and die for want of the only remedy that possibly could arrest the hand of death—change of climate."

Dr. Robert Jackson, in his work on the medical department of the British army, speaks of it as "proved incontestably in a multitude of

instances, that the act of travelling in the open air, is a powerful remedy in some of the least manageable cases of fever. It is not, indeed, found in the catalogue of remedies mentioned by medical writers."

Some practitioners entertain a dread which I believe to be altogether visionary of the "*danger*" attending a removal of the patient, in what they call his exhausted condition, and continue the routine of drugs until both the patient and their remedies are in reality exhausted. Here, again, I must beg to quote Dr. Jackson, whom I believe to be seldom equalled as an authority on matters connected with the medical management of troops. Speaking of his experience in America, the West Indies, and Holland, he says—"It is safe in the late periods of fever, and few cases occur where apparent weakness forbids its use, if it be conducted with caution: nay, many cases have happened in the author's experience when the functions of life, from a state of apparent stagnation, have been speedily and effectually restored to alacrity, by the use of this means alone."

"It is certain," says Lind, "that a person labouring under a fever or flux, will be much less endangered by being conveyed thirty miles on his bed, in a proper carriage, than by continuing twenty hours in the air which produced his distemper. The immediate removal of a patient, in such cases, into another air, often abates the most alarming symptoms of disease, and that even in a few hours."

Those who marched with the miserable remnant of the army, from Rangoon to Upper Ava, will never forget the drooping form and haggard eye of the European soldiers on the day we broke ground, and the condition of the same men on entering Prome, two months afterwards.

It is true, there were many circumstances in operation in this case that are not usual; but there were, on the other hand, many common to all such occasions. On quitting Rangoon, we left our misfortunes behind us, along with the three thousand soldiers, European and Native, whom want and misery of every kind had buried there:* while before us were changes of every kind, *without a possibility of reducing our condition to worse:* there was change to a pure atmosphere, from the marshy-tainted burying-ground that we had occupied for so many months—improved diet and wholesome

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* There perished of the Rangoon European force 3,200 men, of which 3½ per cent. were killed in action, or died of their wounds, being within ½ per cent. of the proportionate casualties during 41 months of the most active period of the Peninsular War. The total loss within the Burmese Territory was 48½ per cent.—consequently each person employed in that war, encountered more risk of life than in three Peninsular campaigns, the total loss of the latter by disease and battle being only 16 per cent.—"It is essential to bring such facts as these prominently to notice, because there is no mode of estimating the severity of military service except by comparison, and it is of importance that the authorities, with whom rests the ultimate reward of the soldier, should have some means of knowing the risk of life and peril of constitution by which his pension has been earned."—*Statistical Reports of the Army.*

exercise;—hope, "the first of the mental tonics," with "its kind cheat and fair fallacy," that makes us believe—

> "We are not where or what we be,
> But what and where we would be;"

in short, it was Phillip le Hardi, with the wreck of his army, quitting Tunis: every thing for which a man lives, we thought before us, while all for which he dies, we knew we had left behind us.

Even in that terrible disease, ophthalmia, which one would think the least amenable to such influences, the effects of change are most remarkable. Dr. Vetch observes that, even when the second stage has commenced, he has never seen any other than the best effects to attend a change of place. Soldiers who have commenced a march with this disease completely formed, though exposed to heat, dust, and fatigue, and not abstaining even from intoxication, are invariably better at the end of the journey, than when they set out. The 2nd Battalion 14th N. I., says Mr. Geddes, left Jaulnah with about 500 sick in hospital from fever; by the time of their arrival at Vellore, nearly the whole of these had perfectly recovered. In the infantile remittent fever, how often do we see a patient, who had been several weeks labouring under the disease, restored to the enjoyment of tranquil and refreshing sleep the night after his removal to a distance of but three or four miles from his ordinary abode.*

Those who have to prescribe change of air to tropical invalids, will find the best guides in the various works of Dr. James Johnson, who has classified the influences of change of air, as they affect our moral and physical nature, in a manner at once scientific and attractive. The moral influences of travel are exhibited in its happy effects on the over-wrought nervous system of the man-of-business, and the anxious care-worn professional man; its correction of evils, both mental and corporeal, which, though they are neither described in our systems of nosology, nor curable by physic, tend nevertheless, by many sure but indirect ways, to death. Change of air abstracts the traveller from the sorrows, griefs, cares, anxieties, and disappointments which harass his mind and wear out the body; it obtunds the over-excited feelings, and gives a serenity and evenness of temper highly favorable to restoration of health; it breaks the chain of morbid association, by which the hypochondriac or dyspeptic is bound to the never-ending detail of his own sufferings, and thus tends, by promoting a cheering and discursive imagination, to inspire hope of returning health.

The physical effects are no less striking; for here change of air diminishes that morbid acuteness or sensibility of the nervous system common

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* Vide Drs. Evanson and Maunsell's excellent work on the Diseases of Children, a work I would strongly recommend to my brother officers in India.

to most diseases, through gentle exercise and exposure to the atmospheric changes and impressions, so as that a degree of exposure which formerly could not be borne, becomes not only harmless but actually beneficial, and the source of acquiring strength, with a bracing effect on the whole, while its influence on the organs of digestion, by increasing both the appetite and the power to digest, is no less remarkable.

To conclude, I have continually found ailments in Calcutta, of a nondescript nature, affecting both mind and body, and in which all treatment was in vain till the sufferer had been released from the cares of official duty, and sent on a trip either to sea (which I always preferred) or else to the upper provinces ;—indeed, where the circumstances of the patient admit of it, this last resource of medicine should never be neglected. It seems to act as a general tonic, invigorating the whole frame, improving the quality of the blood, and stimulating every organ to a more healthy performance of its office.

X.—On the Selection and Improvement of Localities for the European Troops in the East and West Indies.

"There are instances, where the sick list in armies amounts to one third of the total force, and others, where it does not exceed one-fiftieth, even one-hundredth part. The causes of such difference are sometimes visible and obvious. To discover their sources and to prevent their operations is important; and it frequently is a work of no great difficulty."—Dr. Robert Jackson.

It has been justly observed by an able modern surgeon, that "where the hygiene of an army is judiciously regulated, the soldier may be kept in health and vigour; but allow an ignorant general to encamp on a marsh, let filth stagnate, fatigue excessively the men, crowd them in low damp rooms; and, despite drugs, they will fall as unripe and blasted fruit, not by the sword but by the fever."

We have had armies thus scourged through the ignorance and incapacity of their commanders, in countries other than tropical; but a high order of intelligence is working its effects in the army, as in civil communities; and let us hope that England has for the last time witnessed the misery and degradation of her Sovereign's grant of "approbation," for "perseverance and celerity"—for the promptitude with which he, the commander, had commenced, and the vigour with which he conducted," a national tragedy like that of Walcheren.

This was the largest expedition that ever left the shores of England; and, including the naval branch of the armament, it amounted to 70,000 men. The climate into which this powerful force was thrust, *during the*

months of Summer and Autumn, was one in which the Scotch regiment in the Dutch service has been known to bury their whole numbers in three years; where the French army lost one third of the force annually, or 33 per cent.; and where, of a Dutch corps which on arrival three years before the British landing amounted to 800 strong, but 85 men were found alive. Such was the climate of a province within twenty-four hours' sail of our ministers and generals. The conduct of our enemy was here characteristic—"Only keep them in check," said Napoleon, "and the bad air and fevers peculiar to the country will soon destroy their army."

By the 10th of October, 587 per thousand of the entire strength of the army had fallen sick; and of the troops assigned for the defence of Walcheren, there died 142 per thousand of strength; not to speak of the ruined constitutions of the survivors, of whom the greater portion were sufferers from fever for the remainder of their lives; and others, who had escaped on the fatal spot, were seized with fever even so late as a year after their return to England—the longest period of incubation of fever on record. Of the soldiers, 36,000 were admitted into hospital between the 1st of January and the 1st of June 1810; and the whole loss of lives from the military force is stated at 8,000, while the expedition cost the country in money, twenty millions sterling, and imposed a burthen of one million of annual taxes. Such, according to the able report of the Deputy Inspector Marshall, was the statistical result of the Walcheren expedition: it is here noticed, as such information is always important to a military and medical knowledge; and the prosecution of such inquiries will "contribute greatly to direct us to the best means of promoting the welfare, improving the efficiency, and preserving the health of the soldiers."

Mr. Marshall concludes with the following quotation from the Edinburgh Review:—"*The expedition to Walcheren, planned and conducted as it was, was the fruit of statistical ignorance in every one—every where from the prime minister to the commander-in-chief, and from him to the surgeon's mate. That ignorance which every Middleburghian, any Dutchman could have enlightened or dispelled, cost us ten thousand brave men, not a little money, and not a little credit, and not a few tears and inconveniences to those whom statesmen never consider.*"

But to return from this digression. In the West Indies it has long been subject of complaint by the medical officers, that facilities of accommodation for trade—the polar star of British policy—condemns the soldier to the scourge of disease without a necessity. Whoever looks at the distribution of the European military force in the East Indies, will come to the same conclusion—sometimes on grounds less justifiable than have held sway with the authorities in the West.

With reference to the purposes for which the British soldier is brought to India, and to the efficient exercise of his powers when called into action, it has always surprised me that so large a portion of this army has been

retained in the plains throughout the country, and at stations so unhealthy as Fort William, Dum-Dum, Berhampore, Dinapore, &c.—With urgent political reasons, or state necessities, I do not pretend to deal; but if these do not exist, I know of no defence that can be set up, either on the score of humanity, or of expense, in plea of the "serious loss in the balance of national accounts," consequent on the loss of men. "The case is important, and the sovereign power will be false to its own interests, if it do not apply a remedy when furnished with proof that a remedy is attainable, and particularly when informed that it is not difficult of attainment."

If the ground-work of our power in India be, according to Major Sutherland, our substantial body of British soldiers, then are they deserving of our serious care; and military men will hear with an extraordinary interest that, the British soldier who now serves one year in Bengal, encounters as much risk of life as in three battles such as Waterloo; while in Jamaica, he incurs as much risk as of four such actions! In that memorable conflict 1 in 30 of the combatants are said to have fallen, whereas in Jamaica about 1 in 7 die annually. No wonder that, condemned to a residence of 20 years in the East, moving from bad stations to worse, hope should shed but feeble influence over the soldier's enjoyment or future prospect, and that he should thus yield to the temptation of momentary gratification.

In the East, as in the West Indies, the loss of military life from disease has always been great—sometimes prodigious. "If the subject be viewed correctly and without prepossession, the loss sustained will be found to have been principally owing to mistake, that is to inattention to truths furnished by experience for the choice of healthy positions."

The above quotation is from the celebrated work of Dr. Robert Jackson, entitled "*A view of the formation, discipline and economy of Armies,*" and especially that portion of it which he devotes to a general view of service in tropical climates,—wherein, though he speaks with reference chiefly to the West Indian colonies, there is much that necessarily applies with justice to all tropical climates. Dr. Jackson's work ought to be in the hands of every officer, whether military or medical.*

"It is positively true," he says, "proved to a demonstration in numerous instances, but proved by accident, not by avowed experiment—that

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* This work is not sufficiently known in India; and as I am anxious that military men should have a better warrant for its excellence than my opinion, I beg to subjoin that of one of the very highest of British critics on such a subject,—Sir John Moore's:—

"My Dear Jackson,—I have perused your military book, with which I am much delighted. There are none of us, even the most inexperienced, who may not derive instruction from it; and I only regret that you, who possess a soldier's mind, had not been a soldier by profession."

European troops may be so stationed at the islands of the West Indies as to retain their health nearly as well as they could be expected to retain it in their native country. The air of the interior and mountainous parts of the larger of the intertropical islands is comparatively cool and pleasant, and not unfriendly to the European constitution.

" The expense of filling up the military ranks, thinned by sicknesses which arise from bad position and badly constructed quarters, actually amounts, in the course of a few years, to a greater sum of money than would be required to erect barracks of the best form of construction, at the most eligible sites in the country, even at the extravagant price of Government contract." The truth of what is here advanced, Dr. Jackson proves in a statistical summary of the inspection reports on military positions, barracks and hospitals, submitted to the Commander of the Forces on the station. His representations, though so easy of comprehension, met with no attention whatever; and, after a public life of more than half a century, devoted to the good of the soldier, this remarkable man concludes with a prophetic appeal to the " legislative branch of the Government "—there being " a presumption, amounting almost to proof, that it has no chance of obtaining it from the executive."

In another work by the same author, is the following instructive example of the useful application of the labour of the soldier:—

" Fort King George, Island of Tobago, was at one time unhealthy; it is now, as appears by a comparative view of the sick returns of the army, one of the healthiest quarters in the Windward and Leeward Island station. The means through which it was made so, as not of common application, deserve to be brought under public notice. The fact is strong, but it has not made useful impression upon the official authorities. Fort King George stood, in 1803, under the lee of a swamp, at a distance of nearly one mile, and at an elevation of five hundred feet above the level of it. The exhalations which arose from the swamp, carried to the height by currents of strong wind, were supposed to be injurious to the health of the garrison. The cause was obvious, and the effect was so destructive at one time, that the commanding officer of the Royal Scots regiment which then formed the garrison, acting with the impulse of a soldier, determined to drain the swamp by the labour of the men rather than allow them to be destroyed in detail by its pernicious exhalations. The fact is authentic, and it is important. It furnishes unequivocal proof that the European is not less capable of sustaining labour in tropical climates, even severe field labour, than the African; and it is further of value as it shews that the most of what relates to the quarters and accommodations of the military may be effected by the military themselves without expense to the public. The planters lent the tools in the present case; the soldiers of the Royals drained the bog; they did it without reward, and without injury

to their health. Fort King George is now a healthy station; and, as rendered so by the Royals, its future garrison may be supposed to bear an everlasting sense of gratitude to the memory of Lieutenant Colonel Macdonald, who conceived the feasibility of the undertaking from his own good sense and executed it at his own responsibility. What he did was contrary to common medical opinion; it was moreover done without the sanction of the chief military authority."

In Dr. Jackson's works there are many instances of similar results from the gratuitous labour of the soldiers; and, what is very important, this distinguished military physician always concludes, that the thing was done, " with obvious effect upon health, morals, and happiness, while the work was under execution."

The statistical reports of the army have recently borne ample testimony to the truth of Dr. Jackson's reasoning; and the saving of life and of money consequent on a better disposal of the European troops is nowhere more strikingly illustrated than in Jamaica, where, if the same number of British troops who have been stationed at Up-Park Camp, exposed to a mortality of 140 per thousand annually, had been concentrated at Maroon-Town, they would not have lost more than 32 per thousand annually; and the deaths, instead of amounting to 2,042, as they have done at Up-Park in twenty years, would not have exceeded 465, being a saving of life, by the change of that one station, of 1,577. If the cost of each soldier who has thus fallen a victim to the long-established insalubrity of Up-Park is estimated at the low rate of £20., there has thus been lost to the public £31,540., or at least thrice as much as would have covered the expense of erecting barracks for them at Maroon-Town; and so far as can be ascertained, there seems no reason, military or political, why the salubrity of these elevated regions should not be rendered available for securing the health and efficiency of the troops. The same advantages may, with nearly similar results, be extended to almost all the islands in the West Indies, as the few that have not mountain ranges possess situations known to be comparatively favourable to health.

The following table will shew where, in the West Indies, in the event of black troops being employed on a more extensive scale, they are likely to effect the greatest saving of European life; and I need not urge how extensively the principle may be carried out in the East Indies, to the enormous saving both of life and money:—

STATIONS.	Annual Ratio of Mortality per 1000 of White Troops.	Annual Ratio of Mortality per 1000 of Black Troops.	Annual Saving of Life per 1000 of Black Troops employed.
British Guiana	84	41	43
Trinidad.....	106	40	66
Tobago	153	34	119
Grenada.....	62	28	34
St. Vincents	55	36	19
Barbadoes	58	46	12
St. Lucia	123	43	80
Dominica	137	40	97
Antigua	41	29	12
St. Christophers.....	71	46	25
Jamaica	130	30	100

A statistical comparison, such as is here given, or else a comparison of the mortality of soldiers resident within the British dominions, and such as serve in our Eastern and Western possessions, will yield the true measure both of the salubrity of different stations, and of the deleterious influence of tropical climates on European constitutions. This mode of exposition, too, has the double advantage of being reduced to the narrowest scale, and of being at once intelligible to all persons. The medical officers of the Indian army may rest assured, therefore, that facts such as these, and grounded on a careful topographic and statistical examination, will prove alike beneficial to the soldier, and honourable to themselves.

The practical question may now be asked—have we not in our Asiatic possessions any mountainous tracts conveniently situated, wherein the European soldier might live in vigour through the advantages of a better climate, and the proper application of his own labour; and if so, why are they not made use of?

That such favourable localities abound, no one can doubt; and I am disposed to think that the calling the attention of authority to them, for the important purposes stated, will prove one of the most valuable results arising from the plan of calling on military surgeons for notices of the Medical Topography of the country generally.* We must not forget

* The plan here alluded to was suggested by the author of this Report in a statement submitted to the Governor General of India, (Sir C. T. Metcalfe, Bart.) on the 26th March, 1835, and which was finally adopted and ordered for the three presidencies of India on the 23rd November of the same year; and that by the *direct act* of the Government,

the reasons of Montesquieu and Malte-Brun why the inhabitants of the plains should of necessity be weak, effeminate, idle and timid, while the elevated and cold regions are inhabited by their conquerors—regions also wherein the severer forms of fever are unknown; indeed, it has been observed that the diseases of the tropics seem, like the vegetable productions of the same regions, to be restricted to certain altitudes and particular degrees of temperature.

Humboldt states, that yellow fever is never known beyond the height of 2,500 feet; and the most remarkable instance on record of the value of mere elevation as a prophylactic means, is to be found in Maroon-Town, Jamaica, already mentioned, and which is elevated but little more than 2,000 feet above the level of the sea.

Where our European troops are now well located, as respects health, it has happened just as in the West Indies,—" by accident." But it must not be supposed that it is only in the selection of sites for permanent camps and cantonments that care is necessary: the occupation of a bad locality, *if but for one night*, may be productive of serious evil, as I witnessed, and suffered from in my own person, in Upper Ava.

Happy the condition of the European soldier, had a tithe of the sums spent in erecting barracks, been applied to purposes of preparing suitable accommodation in positions of ascertained salubrity; but, instead of that, we have all over India, buildings occasionally of good construction, erected at enormous cost, but which are ultimately abandoned, because, from their faulty positions and consequent insalubrity, their inmates are found to die in a proportion to shock even the humanity of Governments.

" The different erections of the Company for the accommodation of their troops," says Tennant, " have cost several millions, and may be regarded as splendid instances of their economical principles giving way to the comfort of their army. The sums thus expended, laid out at the compound interest of this country, would, at a determinate period not very remote, have equalled the national debt."

The buildings for the troops at Berhampore, lately abandoned for the unhealthiness of the station, are said to have cost, including capital and interest, from first to last, the enormous sum of sixteen millions eight hundred and odd thousand pounds sterling.

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the medical authorities of Bengal having afforded the plan but a very equivocal support, or rather no support at all.

The matter is now in the hands of a large body of highly intelligent officers: the field is almost untouched before them; and I, for one, do not doubt the result, or its great value, even within a few years to come.—J. R. M.

The details* are from the office of the Accountant-General, and that of the Military Board.

The whole of this subject, as affecting troops, is of the highest importance: it was owing to the ignorance or neglect of *military* topography that so much suffering and loss attended the several attempts against Ava during the late war, and that every ultimate object aimed at by Government in sending a force to Arracan, in particular, failed; and it was a similar disregard of *medical* topography that caused the destruction of that force.

The following interesting comparative results of locality and climate have been obtained from documents furnished by the Inspector-General Macleod, and by the Medical Board, the range of observation being from ten to twelve years:—

STATIONS.	Ratio of Admissions per 1000 of Strength.	Ratio of Deaths per 1000 of Strength.
Berhampore	2,196	82·742
Dinapore	2,398	64·261
Fort William	1,883	62·781
Chinsurah	1,930	62·954
Cawnpore	1,599	47·689
Ghazeepore	1,438	36·922
Kurnaul	988	26·81
Meerut	1,109	28·16
Agra	1,360	24·33

The above comparative table exhibits the relative salubrity of several of the military stations in the Bengal Presidency, to which I could add many parallel instances from the sister presidencies, were it necessary. One only will suffice—that of Secunderabad, in which two causes of very easy

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* The military buildings of Berhampore were estimated, in the year 1757, at £302,278., or Rupees 38,23,657 14 8
Compound interest on this sum for 77 years, at 5 per cent.... 16,37,02,404 0 0
Average annual charges for repairs, &c. during 77 years, at the annual average of Rupees 18,000 ..... 13,86,000 0 0

Total..... 16,89,12,061 14 8

Total..... £16,891,206 3 10

Exchange at 2*s.* per Rupee.

avoidance—bad locality—bad barracks and hospitals—have long operated destructively.

There died of the European troops stationed at Secunderabad, during a period of eleven comparatively healthy years, about 79 per thousand of mean strength.

To the actual deaths, however, it is necessary to add those of invalids who may die on their way home, or soon after their arrival there, and which increases the ratio by two, or more; but even this leaves it far under the mark; for the strength of the troops, as stated in the older medical returns, exceeds by more than ten per cent. the mean monthly strength, so that, making the required correction for this and the former error, we shall have, for Secunderabad, the very high ratio of ninety per thousand annually, or twelve beyond that exhibited in the table.

The great mortality at this station is referrible to the following causes; viz. the occupation by the troops of one of the worst known localities, as regards health, yet surrounded by such as are quite as noted for their salubrity; barracks and hospitals of unusually bad construction, the former, being "composed of two squares enclosing one another, so as to make assurance doubly sure against the possibility of perfect ventilation;" defective drainage and sewerage.

In no station in the south of India, except Masulipatam (which has been abandoned), is the mortality so great; and it is produced, as might be expected, chiefly by fever and dysentery of formidable characters:—in short, it would be difficult to determine which is most to be lamented in this unhappy choice of position—the defects of nature or those of art. There died at this station between the years of 1804 and 1835, the large number of 2620, being officers, soldiers, women and children of the British regiment, inhabiting the objectionable locality and buildings spoken of.

It is sufficient here to state, on the authority of the late Dr. Burke, Inspector General, that the excess of casualties in Her Majesty's regiment at Secunderabad, over that of any Corps in the other stations of the Madras Presidency during four years, "is 117 men—a loss intrinsically of that station, exclusive of officers, women and children." By another report it appears that:—

In 1804 the proportion of deaths to strength was				1 in 3·75
„ 1805 „	„	„	„	1 in 8·22
„ 1811 „	„	„	„	1 in 5·08
„ 1814 „	„	„	„	1 in 8·73
„ 1815 „	„	„	„	1 in 3·26
„ 1816 „	„	„	„	1 in 6·56
„ 1826 „	„	„	„	1 in 5·26
„ 1827 „	„	„	„	1 in 8·96
„ 1834 „	„	„	„	1 in 8·39
„ 1837 „	„	„	„	1 in 7·10

Average proportion of deaths to strength during 35 years:—1 in 11·89

The average of deaths during 35 years is stated, in a return by the Madras Medical Board, to be 84·89, making 96·89 according to the corrections, per thousand of strength.

Dr. Burke is worthy of being heard on another important question arising out of this subject—namely, that of finance:—"It has been stated that every European soldier landed in India costs the state £100. sterling; calculating from which, the intrinsic loss of 117 European soldiers by Secunderabad in $4\frac{3}{4}$ years is £11,700. sterling; but as these 117 men have to be replaced, the doing so will cost also £11,700., to which must be added the loss in acclimatizing these latter, amounting on the lowest calculation, to $\frac{1}{8}$th, or £1,462., giving a sum total of £24,862., as the actual loss sustained in $4\frac{3}{4}$ years, or probably as three lacks of rupees in five years. But as Secunderabad would appear to have been a station for European troops for at least thirty years, the cost to the State for that period may be estimated at twelve lacks at least," or about £150,000.

Many persons, it is now hoped, of the class who would save farthings at the expense of the health, comfort and real efficiency of the soldier, will give ready ear, and take care thoroughly to understand this kind of reasoning, but who would not be at the trouble even to listen to medical representations. These last are easily disposed of; and whenever it is troublesome to think, they have only to be stigmatized as a *speculative philanthropy*, and the question is set at rest for another term of years. Amongst such persons, we hear continually of the cost of barracks, and rations; but of the cost of men, never.

Dr. Robert Jackson assures us that this state of things—so injurious to the character of the officer, the welfare of the soldier, and the best interests of the country, will continue, "until physicians have the place in councils of military commanders that is due to science:—the health history of the late wars in Europe is demonstrative in proof of the important fact, that military life has been sacrificed in an enormous proportion to ignorance; that is, to the unwillingness of commanders to be advised on subjects which they could not themselves be supposed to know."

The reflection here cast by one of the ablest and most experienced military physician of any age or country, is deserving of our serious consideration. The character given to the generals of his country (and no man knew them better) does not belong to military talent; for Napoleon—the first of commanders—was most careful of military health, where military or political necessity did not imperiously control him.

This is true, whatever prejudice or ignorance may urge to the contrary; and it is also true that the hospital arrangements for the French troops in the Peninsula were far superior to ours.

Napoleon knew both how to estimate and reward military surgeons:*

* In the Council, held to frame the Code Napoleon, it was proposed by Count

—" there was no point of warfare which more engaged his attention than the care of sick and wounded; and he being monarch as well as general, furnished his hospitals with all things requisite, even with luxuries."—*Colonel Napier's History.*

Of British commanders, Moore cultivated and understood this subject most attentively:—he, who of all our generals knew best how to train the soldier for battle, knew also how best to preserve the soldier's health.

I must now recall attention to the station of Berhampore, which was occupied by European troops since the battle of Plassey till 1835—a period of 77 years. It is a low malarious station, and has always been remarkable, even in Bengal, for its unhealthiness; but in the year 1793, some changes took place in the condition of the river, which, according to Dr. Burke, gave additional vigour to the local causes of disease, and from that

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Mathieu Dumas, that the orders of the Legion of Honour should be confined to military men.

" Such ideas," said Napoleon, " might be well adapted to the feudal ages, when the chevaliers combated each other man to man, and the bulk of the nation was in a state of slavery; but when the military system changed, masses of infantry and phalanxes, constructed after the Macedonian model, were introduced, and after that, it was not individual prowess, but science and skill, which determined the fate of nations."—* * * " What is it now which constitutes a great general? It is not the mere strength of a man of six feet high, but the *coup-d'œil*, the habit of foresight, the power of thought and calculation; in a word, civil qualities, not such as we find in a lawyer, but such as are founded on a knowledge of human nature, and are suited to the government of armies. The general, who can now achieve great things, is he who is possessed of shining civil qualities; it is the perception of the strength of his talents which makes the soldiers obey him." * * * " We must not reason from ages of barbarity to these times. France consists of 30,000,000 of men, united by intelligence, property, and commerce. Three or four hundred thousand soldiers are nothing in such a mass; not only does the general preserve his ascendancy over his soldiers, by civil qualities, but when his command ceases, he becomes merely a private individual. The soldiers themselves are but the children of citizens. The tendency of military men is to carry every thing by force; the enlightened civilian, on the other hand, elevates his views to a perception of the general good. The first would rule only by despotic authority, the last subject every thing to the test of discussion, truth and reason. I have no hesitation, therefore, in saying, that if a preference was to be awarded to one or the other, it belongs to the civilian. If you divide society into soldiers and citizens, you establish two orders in what should be one nation. If you confine honours to military men, you do what is still worse, for you sink the people into nothing."

" Moved by these profound observations, the council agreed that the proposed honours should be extended indiscriminately to civil and military distinctions;"*—while, up to this day, the government of England considers such as the Earl of Chatham, Generals Whitelock and Prevost, more deserving of honours, than men like Pringle, Blane, Robert Jackson, Macgrigor, Burnett, James Johnson, Wm. Fergusson, Hennen, Guthrie, and a host of distinguished officers, who have encountered every kind of danger, in all climates and situations, and who have conferred incalculable benefits on the fleets and armies of England, as well as on mankind at large.—* *Alison's History of Europe.*

time the mortality increased. The cost in money on account of lives lost in excess, if added to the finance statistics given at page 583, would go to make this station one of the most expensive ever occupied by British troops.

By another table furnished me by the late Inspector-General Macleod, I find that, on an average of thirteen years, the admissions at this station per thousand of mean strength, were 2,196, while the deaths were, out of the same proportion, 103 per annum—the ratio of deaths to cases in hospital being, during five years, as follows :—

In Fever, one in 21 and a fraction.
„ Dysentery, one in 10 „
„ Hepatic diseases, one in 9 „

At Dinapore again, by a table similar to the above, and from the same authority, I find the annual admissions per thousand of mean strength 2,398, while the deaths are 106—the ratio of deaths to cases treated being, during five years, as follows :—

In Fever, one in 34 and a fraction.
„ Dysentery, one in 8 „
„ Hepatic diseases, one in 6 „

At the last station, the barrack and hospital accommodations are said to be extremely bad, while at Berhampore both are unexceptionable. Here the injury to health lay in the locality—a fault that no buildings could remedy ;—so that, after seventy-seven years of trial, the station was abandoned in 1835, by order of Lord William Bentinck.

The following brief notices may serve to point out to the inexperienced, both the localities to choose and such as are to be avoided.

Localities to Choose.

1st. Where military circumstances admit, an elevated and dry soil should be selected, on the declivity of hilly or undulating ground; the most healthy sites being such as do not retain moisture.

2d. Open downs, so called, are healthy.

3d. Such grass lands as have a sufficient inclination are also healthy.

4th. The elevated banks of rivers that have a sufficient fall either way.

5th. Tongues of land, or slender promontories, jutting well into the sea.

6th. It is said that wherever pure spring water is procurable, there the ground is fit for encamping or cantoning troops.

Localities to Avoid.

1st. All damp ground to be carefully avoided; and even where the surface may appear almost parched up and destitute of vegetation, if it be

saturated by moisture underneath, such as by previous rains, it will be found charged with the worst exhalations.

2d. Half-dried beds of rivers, canals, tanks, and ditches, or narrow gorges.

3d. Marshy grounds, and such as are elevated above neighbouring marshes, or such as are exposed to winds or currents passing over marshy grounds.

4th. Ground covered with underwood, or the vicinity of such ground.

Though not in perfect relevancy to the subject of this article, I shall insert the following directions for the guidance of medical officers, and such as may be in command of troops about to embark on board of ship, and who should attend to the following circumstances :—

1st. The condition of the transport vessel, and state of health, of the crew. When ships of war are used, a frigate to be preferred to a ship of the line.

2d. That all old and foul ballasting be changed, and no fresh or green wood be allowed in the ship's hold, or any matter capable of ready decomposition.

3d. State of health of the troops to be carefully examined, and cases of contagious disease, old or extensive ulcers, to be left behind.

4th. On no account to permit crowding of the men, and to see that berths are secured for the sick and married. On no account should the aggregate number of men exceed the proportion of one man to two tons of measurement.

5th. That the men are not allowed to quit the ship, or to be on deck after sunset, especially if navigating rivers, or along level or marshy sea-coasts.

6th. Particular examination of the provisions should be made, and that the salted meat is not old : the same in regard to the water, which should, when possible, be from springs, and be kept in iron tanks : there should be quick-lime for the purpose of purifying it.

7th. For distant expeditions, there should be hospital ships, well provided, in order to the separation of sick from the healthy.

8th. Cold and moisture in the ship's hold are to be guarded against, and the pumps to be frequently worked, so as to leave but a few inches in the well.

9th. Ventilation and cleanliness to be promoted by every means, and in bad weather, when wind-sails cannot be used, fire-pots, or portable stoves, should be carried between decks.

10th. During fair weather, the men should be made to bathe daily.

11th. Moderate exercise and amusement of every kind to be encouraged by every means, during a voyage ; and an union of strict discipline, with indulgence and humanity towards the men, should characterise the conduct of all classes of officers.

J. R. M.

ON

INDIGESTION;

OR

MORBID SENSIBILITY

OF THE

STOMACH AND BOWELS,

&c. &c. &c.

Sect. I.—Preliminary Observations.

The class of complaints forming the subject of investigation in this Essay is of most extensive bearing, and of paramount importance—not only to the valetudinarian—but to almost every individual in civilized life; a class which so much disturbs our moral as well as our physical nature, that it is hard to say which is the greater sufferer, the mind or the body! This malady, or rather abstract of all maladies, is in itself such a Proteus—arises from so many different causes—assumes so many different shapes—produces so many strange and contrary effects—that it is almost as difficult to give it a name as to describe its ever-varying features. It knocks at the door of every gradation of society, from the monarch, in his splendid palace, down to the squalid inhabitant of St. Giles or Saffron Hill, whose exterior exhales the effluvium of filth, whose interior that of inebriating potations. No moral attributes, no extent of power, no amount of wealth, are proofs against this wide-spreading evil. The philosopher, the divine, the general, the judge, the merchant, the miser, and the spendthrift, are all, and in no very unequal degree, a prey to the Proteian enemy. If this statement be correct—if, under such a variety of circumstances, and excited by such a variety of causes, the same malady or class of maladies, should be found to assail such different characters, and give rise to such an endless variety of phenomena, there must surely be some connecting link, some prevailing error, some pervading disposition, common to all, which can thus place the philosopher and the peasant, the affluent and the indigent, the virtuous and the vicious, on one common level in regard to a particular affliction of body and mind.

The designations which have been applied to this genus or class of diseases are numerous, and none of them expressive of the real *nature* of the malady, but only of some of its multiform symptoms. Of all these designations, INDIGESTION has been the most hacknied title, and it is, in my opinion, not the least erroneous. The very worst forms of the disease—forms, in which the body is tortured for years, and the mind ultimately wrecked, often exhibit no sign or proof of indigestion in the common sense of the word—the appetite being good—the digestion complete—and the alvine excretions apparently natural. Nearly the same objection lies against the term DYSPEPSIA, or difficult digestion. The train of symptoms exhibited in indigestion or dyspepsia, is only one feature (a very common one, I grant) of the Proteiform malady under consideration; and by no means the most distressing one. The term HYPOCHONDRIACISM conveys no just idea of the *nature* of the disease, though a group of some of its more prominent phenomena is usually understood by that term. Cullen was very wrong in defining hypochondriasis to be "indigestion with languor, sadness, and fear, from inadequate causes, in a melancholic temperament." Many of the most exquisite specimens of hypochondriacism are unattended with indigestion. Neither is Falret correct in making the *brain* the constant primary seat of hypochondriacism. The mind is affected no doubt—but only in a secondary manner. "Bilious disorder" is a term equally vague and equally erroneous as the others. Derangement of the biliary secretion is a frequent concomitant, perhaps a frequent cause or consequence of the malady; but it is by no means always present, and when present, it is only one feature of the disease, and does not constitute its nature or essence. Of the various other designations, as spleen, vapours, melancholy, nervousness, irritability, mental despondency, &c. I need only say that they are forms or features of a disorder which assumes almost all forms. It would, therefore, be of some advantage to society at large as well as to the profession, could we ascertain the leading causes by which this disorder is produced, the link by which its ever-varying features are connected, and the means by which so complicated an affliction may be averted, mitigated, or removed. In order to clear the way for this investigation, the importance of which will be presently seen, it is necessary to make a few physiological observations.

In the nervous system we distinguish two great classes of nerves—those which take their origin from the brain and spinal-marrow—and those which are called the ganglionic nerves. The *former* transmit sensations to the sensorium, or organ of the mind, and nervous influence to the voluntary muscles—the *latter* regulate the functions of various vital and other organs, as those of the stomach, liver, heart, &c. It is in the first class of nerves that we find the common sensibility of touch, and also the other senses, as sight, hearing, smelling, and tasting. These nerves of sense teach us, at once, that special or particular kinds of sensibility only are possessed by

particular nerves. The optic nerve is only sensible to *light*, and will not convey the sense of touch, hearing, tasting, or smelling. The eye, in a state of health, may be touched by the finger, and hardly a sensation will be excited; but let the same organ be inflamed, or irritated, and then the most painful sensation will be produced by the slightest touch. In the same way, the cartilaginous surfaces and the lining membranes of the joints are endued with a peculiar, or special, and not a common sensibility. They feel not the friction produced by even violent motion; but let inflammation or irritation take place in these parts, and then the peculiar, unconscious, or what may be termed *organic* sensibility will be raised or changed into common or even morbid sensibility, and the slightest motion will be attended with exquisite pain. Again, the auditory nerve receives no impression from light, or any thing but sound. The nerves distributed over the body for touch, will not convey any other impression than that which is peculiar to their office.—Whenever the proper stimulus is applied to any of these nerves, we are conscious of the impression, at least while we are awake.

Now the ganglionic nerves have their peculiar offices and stimuli, as well as the cerebro-spinal nerves—but with this great difference, that we are quite unconscious of the impressions made on them, so long as the impression is within the range of salutary action. The stomach is as sensible to the stimulus of food as the eye is to light, but we feel nothing of the impression. Let any one attentively observe when he eats plain food, or swallows plain drink. He feels both of these in his mouth and palate; but the moment that either of them passes down into the stomach, he is quite unconscious of its presence in that organ. It is so with all the other internal organs. The lungs feel the air, but we are not conscious of its presence in the air-cells—the heart feels the stimulus of blood, without our knowledge—the gall-bladder is sensible to the presence of bile—the intestines to chyme and to fæces—the urinary bladder to urine, and so on—while the intellectual system is quite unconscious of all these sensations.

But let us go a step farther. Swallow a tea-spoonful of tincture of capsicum, or a table-spoonful of brandy; and then you feel not only a burning sensation in the mouth and throat, but a certain *degree* of the same sensation in the stomach.* Simple as this experiment may appear, and unimportant any conclusion thence resulting, it nevertheless unfolds

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* We hear it commonly laid down by lecturers and physiological writers that there is greater sensibility at the extremities of tubes and passages in the body, as the œsophagus, urethra, rectum, &c. than in the other portions of the same conduits. This is not a very correct view of the subject. There is more of common or *cutaneous* sensibility at these extremities of passages, but less of the *special organic* sensibility or excitability peculiar to each structure. When warm water is thrown up by a syringe into the rectum and colon, the heat is only felt in the anus, unless the temperature be so high as to greatly offend the organic sensibility of the mucous membrane, when a

one of the most fundamental views in pathology, and one of the most useful precepts in the art of preserving health. The moment we call forth *conscious sensation* or excitement in the stomach, whether it be of a pleasurable or a painful kind, we offer a violence to that organ, however slight may be the degree. Whenever the *conscious sensibility* of the stomach (or, indeed, of any other internal organ) is excited by any thing we introduce into it—by any thing generated in it—or by any influence exercised on it, through the medium of any other organ, we rouse one of Nature's sentinels, who gives us warning that her salutary laws are violated, or on the point of being violated. Let us view the matter closer. We take an abstemious meal of plain food, without any stimulating drink. Is there any *conscious sensation* produced thereby in the stomach? I say no. We feel a slight degree of pleasant excitement throughout the whole frame, especially if we have fasted for some time previously, but no distinct sensation in the stomach. There is not—there ought not to be, any *conscious excitement* or sensation induced in this organ by the presence of food or drink, in a state of health—so true is the observation, that to feel that we have a stomach at all is no good sign.

The physiological action of food and drink on the stomach is shown more on other organs and parts than in the stomach itself. When the quantity is moderate and the quality simple, there is nothing more experienced than a general sense of refreshment, and the restitution of vigour, if some degree of exhaustion have been previously induced. We are then fit for either mental or corporeal exertion.* But let a full meal be made, and let a certain quantity of wine or other stimulating liquor be

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sense of pain rather than of heat is felt in the bowels. It is the same with cold water injected into the intestines. It produces the sensation of cold in the rectum, but no sensation at all in the intestines, unless it be of very low temperature, when it occasions a dull *colicky pain* in the bowels.

It is highly probable that different portions of the alimentary canal are endued with different *kinds* of sensibility or rather excitability. The sensibility of the stomach is in accordance with the presence of *undigested* food, when first swallowed, which would and does occasion much inconvenience in the duodenum and other intestines; while we know that the presence of bile in the duodenum produces no unpleasant effect there; whereas, if it regurgitate into the stomach, it disorders the whole system. The organic sensibility of the large intestines is very different in kind from that of the small. The presence of fæcal matters in the colon and rectum produces no sensation; but if substances pass down undigested from the stomach, the whole line of the intestines is irritated and disturbed—although the effects are often not felt *there*, but in various other parts of the body from sympathy. Onions, chesnuts, and a hundred other things, eaten in the evening, will disturb the organic or special sensibility of the stomach and bowels, producing what is called the fidgets, restlessness, incubus, and sundry other disagreeable effects, in parts of the body far remote from the actual seat of irritation.

* I should, perhaps, except the *dinner* meal, which is always followed by some degree of mental and corporeal inaptitude for exercise, however temperate the repast, especially in civilized, or artificial modes of life.—*9th Edition.*

taken;—we still feel no distinct sensation in the stomach; but we experience a degree of general excitement or exhilaration. The circulation is quickened—the face shews an increase of colour—the countenance becomes more animated—the ideas more fluent. This excitement from food and drink, however, is not only transient, but is moreover partial. In proportion as we have excited the ganglionic system of nerves, or, in other words, the involuntary or vital organs (stomach, heart, &c.), we disqualify the voluntary muscles for action, and the intellectual system for deep thought and other mental operations. In fact, we are then only fit to sit and talk very comfortably over our wine—and ultimately go to sleep. Whether this habit, which is that of civilized life in general, be that which is best adapted for preserving or regaining health, is a question which I shall presently discuss: but in the mean time, it will be sufficiently evident that pleasurable sensations are diffused over mind and body, by the presence of food and wine in the stomach, *without the existence of any distinct sensation or sensible excitement in the stomach itself.* This is an obvious truth, and it is of great importance to remember it; for if the nerves of the stomach, *in a state of health*, be capable of exciting pleasurable emotions in the mind, and comfortable sensations in the body, on the application of good food and generous wine, we shall find that the same nerves, *when in a disordered state*, are equally capable of exciting the most gloomy thoughts in the mind, and the most painful sensations in the body, on the application of the very same species of refection, either with or *without* an unpleasant sensation in the stomach itself.

When the stomach is in a *healthy* condition, the application of certain agents will irritate its nerves, and produce a train of phenomena bearing considerable analogy to those resulting from the application of common food in a disordered state of the gastric nerves. Thus, let some tartar-emetic be secretly introduced with the wine which a man drinks after dinner. Instead of the pleasant sensations usually produced by this beverage, he soon begins so perceive a languor of mind and body—the face grows pale instead of red—the mind is unsteady and depressed—the muscular power is diminished—the head aches or becomes confused—the heart beats slowly or intermits—in short, there is a prostration of all the corporeal and intellectual powers—and all this, in many cases, before any disagreeable sensation is felt in the stomach. At length, nausea and vomiting take place, if the dose be sufficient—the contents of the stomach are ejected—re-action succeeds—and the mental and corporeal energy is once more restored. If tincture, or any other preparation of digitalis be introduced into the stomach, a train of the most distressing symptoms is induced throughout the whole system. The head becomes giddy—the sight imperfect—strange noises are heard in the ears—dreadful depression of spirits is experienced, with a feeling or fear of dying—irregular action of the heart—sense of sinking at the pit of the stomach, &c. &c. These

phenomena will often go to a great height, without any distinct or disagreeable sensation in the stomach itself. Sometimes, however, and especially if the deleterious agent be introduced abruptly and in large quantity, nausea and sickness of stomach are among the first phenomena (though never the *very first*), and the other symptoms above enumerated follow. A thousand examples might be adduced where certain articles both of food and physic act in this manner on the nerves of the stomach, in the midst of health, and from thence diffuse their baleful influence over mind and body. These examples are familiar to the medical practitioner, and there is scarcely an individual who has not experienced, in his own person, a sample, more or less impressive, of the above kind.*

These facts authorize us to conclude, *first*, that, from the stomach, a diffusive energy and pleasurable feeling may be extended to all other parts of the body, and also to the mind, or at least to the organ of the mind—*without any distinct pleasurable sensation in the stomach itself*:—*Secondly*, that, from the stomach, may be diffused over the whole system, intellectual and corporeal, a train of morbid feelings and phenomena of the most distressing kind, with or *without* any distinct sensation of pain or uneasiness in the organs of digestion.

This view of the subject will be found of great importance in the investigation of diseases. It leads us to divide into two great classes, those symptomatic or sympathetic affections of various organs in the body, dependent on a morbid condition of the stomach and bowels—viz. into that which is accompanied by *conscious sensation*, irritation, pain, or obviously disordered function of the organs of digestion—and, into that which is *not* accompanied by any *sensible* disorder of the said organs or their functions. Contrary to the general opinion, I venture to maintain, from very long and attentive observation of phenomena, in others as well as in my own person, that this *latter* class of human afflictions is infinitely more prevalent, more distressing, and more obstinate, than the *former*. It is a class of disorders, the source, seat, and nature of which are, in nine cases out of ten, overlooked—and for very obvious reasons,—because the morbid phenomena present themselves any where and every where, except in the spot where they have their origin. But, it may be asked, what are the proofs that various disorders, mental and corporeal, have their origin in gastric or intestinal irritation, that irritation not being sensible to the individual? I answer, that the proofs will be found in the observation of cases every hour presenting themselves in practice. I ask for no assent to propositions or assertions, unless they accord with the experience of the practitioner himself. There are great numbers of dyspeptics

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* Green tea has been known to occasion such formidable symptoms as to threaten death.—*9th Ed.*

in the profession as well as out of it. Let these observe, in their own persons, the phenomena which I shall point out as proofs of the positions I have laid down, and decide according to the evidence of their own senses.

I have already shewn, in the examples of antimony and digitalis (and the list might be increased *ad infinitum*), that the remotest parts of the system may be thus disordered through the medium of the stomach, before any *sensible* effect is produced on the stomach itself. This, however, is in a state of health. But let the nerves of the stomach and bowels acquire a morbid sensibility or irritability from any of the various causes which I shall hereafter detail, and then it will require no such application as that of antimony or digitalis to induce a host of affections in remote parts of the body. Such food and drink as, in health, would only nourish or agreeably stimulate, will then act like a poison on the system, deranging the mental, and disordering the corporeal functions, often without the slightest *sensible* inconvenience in the stomach and bowels themselves.* How is this ascertained? By simple observation. Let a person, labouring under any of those multiform symptoms included in the terms dyspepsia, hypochondriasis, &c. and more especially under mental despondency, brought on, for example, by moral afflictions, *but who feels no inconvenience in the stomach itself*, take food and wine in rather too great a *quantity*, or of a certain *quality*, and the symptoms will be aggravated, not perhaps immediately upon ingestion but after a short lapse of time, often without any of the phenomena of indigestion. Let the same person reduce the *quantity* of even mild food, or abstain a whole day from any strong food; and let him take no wine or vegetable substance of difficult digestion; and he will find the symptoms mitigated. Let him return again to pretty full meals of mixed animal and vegetable diet, with his usual allowance of wine;—again will the corporeal, and especially the mental disorder be exasperated. Let him adhere strictly to a very moderate proportion of the simplest and most unirritating species of food and drink, and take such medicine as may be calculated to restore the natural, or soothe the morbid sensibility of the stomach and bowels; and then, if he does not experience, in a reasonable period of time, the most marked and surprising change for the better, I will acknowledge that all my observations are mere creatures of the imagination. I have seen so many instances proving incontestibly the

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* I may quote the authority of Whytt for this observation. "When the feeling of the nerves," says, he, "in *any of the organs* of the body becomes *unnatural or depraved*, the most disagreeable sensations and alarming symptoms are sometimes raised by the application of such substances as, in a sound state, would produce no manner of disturbance; and hence we may understand the surprising effect of certain smells, aliments, and medicines, on many delicate people."—*Whytt on Nervous Disorders. 9th Edition.*

truth of these positions, that I am convinced the great majority of those complaints which are considered purely mental, such as irritability and irascibility of temper, gloomy melancholy, timidity and irresolution, despondency, &c. might be greatly remedied, if not entirely removed, by a proper system of temperance, and with very little medicine. On this account, medical men often have it in their power to confer an immense boon of happiness on many valuable members of society, whose lives are rendered wretched by morbid sensitiveness of the mind, having its unsuspected source in morbid sensibility of the stomach, bowels, or nervous system.

From numerous facts, indeed, which have come within my own observation, I am convinced that many strange antipathies, disgusts, caprices of temper, and eccentricities, which are considered solely as obliquities of the *intellect,* have their source in *corporeal* disorder. I could relate some curious illustrations, were I not prevented by regard to the personal feelings of others.

Before entering on the subject of INDIGESTION, as it is commonly called, it may be proper to take a concise view of PERFECT DIGESTION—since it is only by comparison that we can distinguish disordered from healthy function of an organ.

SECT. II.—DIGESTION.

THIS process, taken in its most general and most proper sense, may be defined, "the CONVERSION OF DEAD INTO LIVING MATTER." At all events, it is the conversion of dead animal and vegetable substances into an animalized fluid qualified to enter into the current of the circulation, and there become part and parcel of the living machine. No other fluid, not even milk from the living udder, can be poured into the bloodvessels, without risk of life, and therefore we are authorised to conclude, that the chyle is a vitalized fluid like the blood itself. If this be a correct representation, and I believe it is, all inquiry as to *how* the change is effected, will be just as successful as the inquiry *how* man was changed from lifeless clay into a living animal at his first creation. But the prying eye of the physiologist has penetrated into some of Nature's secret operations, and there are several curious phenomena *attendant* on the process of digestion, which may be glanced at in this place.

The food is, or ought to be, well masticated by the teeth, and is then propelled into the stomach, incorporated with a quantity of saliva. In the stomach, this mass is applied to the internal surface of the organ, and, layer after layer, is there converted into chyme by the gastric secretion, or

some vital power of which we are ignorant, and moved forward to the pyloric orifice, through which it is gradually propelled into the duodenum or second stomach. The muscular power of the stomach is, of course, the agent in moving forward the layers of digested matter; and thus, in succession, the whole mass which descended from the mouth is converted into a bland, whitish, cream-like substance, and finally expelled through the pylorus. The length of time necessary for this process, and the degree of perfection in the process itself, vary in different individuals, and at different times in the same individual, according to the vigour of the organ, the nature and quantity of the aliment, and the state of mind and body during the period of digestion. According to the experiments of Dr. Philip on rabbits, it would appear that the chyme passes through the pyloric orifice, as it is formed in layers along the coats, and especially the great curvature of the stomach; but the attendant phenomena, in man, would incline us to believe that there is an accumulation of the chyme in the pyloric extremity of the stomach, during the first period of the gastric digestion at least, when it begins to pass off into the duodenum, with a correspondent change in the attendant phenomena. The experiments of Majendie and others would tend to shew that the food remains an hour or more in the healthy stomach before the change into chyme *commences*—and this appears highly probable, if we may judge by the external phenomena. Be this as it may, it requires from two to four or five hours, for the *completion* of the digestion in the stomach; and sometimes much more than this, when the powers of the organ are weak, or the materials difficult of solution.*

In perfect health, if the quantity of aliment be moderate, and of a proper kind, the process of digestion scarcely disturbs the other functions of body or mind, and the individual is fit for his ordinary occupations, as I have already remarked. But whether it is that the stomach is rarely in a state of perfectly natural health, or that the quantity and quality of our food and drink are too great or too exciting, it generally happens that a train of obvious phenomena take place, of which the following are the principal: viz. after an exhilaration of spirits, a sense of fulness in the region of the stomach, with some degree of heat there—a chilliness in other parts of the body—sense of inaptitude for exertion, whether intellectual or corporeal—increase of quickness in the pulse—diminution of several of the secretions—concentration of the circulation towards the organs of digestion, and a diminution of fulness in the capillaries of the skin—increase of secretion in the liver, pancreas, and mucous membrane of

* In the 12th Number of the Medico-Chirurgical Review, published on the 1st of April, 1827, the reader will find a very curious suite of experiments on the digestibility of different substances in the living human stomach, made in consequence of a fistulous wound of that organ. Dr. Beaumont has extended his experiments since the 8th Edition of this work was published, as will be seen farther on.

the stomach and upper intestines—and lastly, a disposition to lie down and sleep.

It may be contended that these are natural phenomena, and *ought* to take place. We see animals lie down and sleep after they have satisfied their appetites. This is true; but they are generally animals of voracious propensities, or domesticated animals that are pampered. These gorge themselves, and then lie down to sleep. Their example is not to be followed by man. Those who live temperately and labour hard, are nearly as capable of work after dinner as after breakfast, making allowance for the fatigue previously undergone.*

From the above description of facts, it must be obvious that slow and complete mastication of the food is of the utmost importance; for, as Dr. Philip has properly remarked, this slowness of eating is a preventive of repletion, by drawing the action of the gastric fluid from the stomach to the food, and thus diminishing the appetite or sense of hunger. It will also be evident that the admixture of a large quantity of drink with the food, must greatly impede digestion, not only by over-distending the stomach, but by diluting too much the gastric fluid.

EVACUATION OF THE STOMACH.

In one, two, or three hours, then, the stomach begins to evacuate the digested aliment through the pylorus into the duodenum; and, in four, five, or six hours, the organ is emptied. In perfect health, and where the food is of proper quality and quantity, the whole of this process produces little or no sensible feeling in the individual, and when the stomach and upper portion of intestine are completely evacuated, the appetite returns again. But it is to be observed that, in proportion as the chyme passes from the stomach to the duodenum, the whole of the general phenomena before enumerated, become, as it were, reversed. The sense of fulness diminishes—the chilliness changes into a glow of heat—the mental and corporeal aptitude for exertion returns—the pulse falls to its natural standard—the secretions are all, or almost all increased—and, in short, the individual is completely recruited, and fit for his usual avocations.

In the duodenum, the chyme, mixes with the bile and pancreatic secretion—the fluid then becomes more animalized, and, as it passes along the

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* At the same time, I would not advise those who have weak digestion to use exercise, if they can avoid it, for an hour or two after dinner, even if the repast be very temperate. Any considerable degree of corporeal exertion in them would be sure to interrupt the process of digestion;—and, in such individuals, a short repose, on the sofa, after the principal meal, is by no means insalutary. After this repose, which allows the process of first digestion to go on without interruption, the individual gets up refreshed, and fit for mental or corporeal exercise.

intestines, the chyle, or milky nutriment, is taken up by the lacteal vessels, and carried into the torrent of the circulation by means of the thoracic duct. The fæcal remains passing along the colon take a shape and figure in the rectum, and are generally evacuated the next morning.

The changes which the chyme undergoes in the duodenum and upper intestines, and the passage of the useless residue along the colon *ought not* to cause any sensation, any extrication of air that is inconvenient, or, in fact, any phenomenon by which the individual might be rendered conscious that the process of digestion was going forward at all.

Such is a rapid sketch of healthy digestion; and every deviation from the course here described, is, more or less, a deviation from health, or, in other words, an indication of disorder, or, at least, of disturbance, in the important function of digestion.

Sect. III.—Digestibility of Various Kinds of Food.

On the digestibility of different alimentary substances, a very curious series of experiments was made by M. Gosse, of Geneva, and is recorded by Spalanzani. This gentleman, by swallowing air, was able, at any time, to disgorge the contents of his stomach, and thus examine the comparative digestibility of different articles of food.

M. Gosse informs us that, in about an hour and a half after taking food, the aliment is changed into a pultaceous mass, the gastric juice merely rendering it fluid, without altering its nature. When the digestion was properly carried on there was no appearance of acid or alkali, and it required about three hours for its completion. When the digestive power, on the other hand, was weak, vegetable food ran into the acetous fermentation, and animal food into the putrefactive. In these states of weak or impeded digestion, vegetable matters, wine, and even spirits, soon degenerated into a strong acid; while all oily substances became rancid, and animal matters putrid, producing sour and fetid eructations. The following results of Dr. Gosse's experiments on himself and animals, seem, with a few exceptions, to accord with general observation, and are, with those of Dr. Beaumont, all that may be necessary, in an essay of this kind, for the guidance of the dyspeptic.

I.—Substances insoluble, or very difficult of Solution in the Stomach.

Animal Substances.—1. Tendinous parts. 2. Bones. 3. Oily, or fatty parts. 4. Hard-boiled white of egg. 5. Skins of fishes.

Vegetable Substances.—1. Oily seeds. 2. Expressed oils of different nuts and kernels. 3. Dried grapes (raisins). 4. Rind of farinaceous substances. 5. Pods of beans and peas. 6. Skins of stone fruits. 7. Husks of fruit with grains or seeds. 8. Stones of fruit.

II.—Substances partly soluble and partly insoluble.

Animal Substances.—1. Pork dressed in various ways. 2. Black-puddings. 3. Fritters of eggs, fried eggs and bacon.

Vegetable Substances.—1. Dressed salads of various kinds. 2. White cabbage less soluble than red. 3. Beet-root, onions, and leeks. 4. Roots of red and yellow carrots. 5. The pulp of fruit with seeds. 6. Warm new bread and sweet pastry. 7. Fresh and dried figs. Of all these substances there were parts which were not digested in the stomach, but which were digested, however, while passing along the intestines, though at the expense of irritation there.

III.—Substances soluble and easy of Digestion, requiring an Hour or an Hour and a Half for their Reduction into a Pulp in the Stomach.

Animal Substances.—Veal, lamb, mutton, and *the flesh of young animals in general, are more easy of digestion than that of the old.* 2. Fresh eggs. 3. Cow's milk. 4. Perch boiled.*

Vegetable Substances.—1. Celery, tops of asparagus. 2. Bottoms of artichokes. 3. Boiled pulp of fruits. 4. Pulp or meal of farinaceous seeds. 5. Different sorts of wheaten bread, without butter, the second day after baking, the crust more so than the crumb. Brown bread, in proportion as it contains more bran, is less digestible. 6. Turnips, potatoes (mealy), parsnips, not too old.

IV.—Substances which appeared to facilitate the Power of the Gastric Juice.

Salt—spices—mustard—horse-raddish—capers—wine and spirits in small quantities—old cheese—sugar in small quantity—bitters. Gentle exercise. ☞ *The exercise should be very gentle indeed. It should be passive rather than active.*—J. J.

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* Such was the result of Gosse's experiments upon himself. Generally speaking, however, the flesh of *full-grown animals* will be found of easier digestion than that of either the young or the old. Veal, too, should not have been put at the head of the list. The easy digestibility of milk is very questionable.—J. J.

V.—SUBSTANCES WHICH RETARDED THE POWER OF THE GASTRIC JUICE IN THE STOMACH, AND OCCASIONED SOME OF THE FOOD TO PASS UNDIGESTED INTO THE INTESTINES.

Water, particularly when taken hot, and in large quantity—acids—astringents—oily substances—strong and violent exercise. ☞ He might have added *mental exertion*.—J. J.

The foregoing results of experiments, though not, perhaps, free from error, form a tolerably correct rule for the guidance of patient and practitioner. But such is the difference of digestive power possessed by different individuals, and such the peculiarities, or, we might say, the caprice of some stomachs, that it is quite impossible to form any scale of digestibility as to the various species of food which is not liable to numerous exceptions. Each individual soon finds out what agrees or disagrees in diet, especially when the stomach is weak, or in a disordered condition; whereas, in health, almost every thing will digest, when taken in moderation. As this is not a professed Essay on diet, but on disordered conditions of the organs of digestion, I shall say no more on the subject of diet generally, but refer to express treatises on alimentation.

I have already alluded to some curious experiments which were made on digestion, by Dr. Beaumont, of America. The opportunity which Dr. B. enjoyed was unique—being the case of a man into whose stomach he could introduce all kinds of substances through a fistulous wound, and where he could also have ocular demonstration of the processes that were carried on.

TABLE shewing the Mean Time of Digestion of the different Articles of Diet.

Articles of Diet	Mode of preparation	Time required for digestion		Articles of Diet	Mode of preparation	Time required for digestion	
		H	M			H	M
Rice	Boiled	1		Chicken, full-grown..	Fricassee	2	45
Sago	Do.	1	45	Eggs, fresh	Hard-bd.	3	30
Tapioca	Do.	2		Do. do.	Soft do.	3	
Barley	Do.	2		Do. do.	Fried	3	30
Milk	Do.	2		Do. do.	Roasted	2	15
Ditto	Raw	2	15	Do. do.	Raw	2	
Gelatine	Boiled	2	30	Do. whipped	Do.	1	30
Pig's feet, soused ..	Do.	1		Custard	Baked	2	45
Tripe, soused	Do.	1		Codfish, cured, dry ..	Boiled	2	
Brains	Do.	1	45	Trout, Salmon, fresh..	Do.	1	30
Venison steak	Broiled	1	35	Do. do. ..	Fried	1	30
Spinal marrow	Boiled	2	40	Bass, striped, fresh ..	Broiled	3	
Turkey, domestic ..	Roasted	2	30	Flounder do. ..	Fried	3	30
Do. do. ..	Boiled	2	25	Catfish do. ..	Do.	3	30
Turkey, wild	Roasted	2	18	Salmon, salted	Boiled	4	
Goose..	Do.	2	30	Oysters, fresh	Raw	2	55
Pig, sucking	Do.	2	30	Do. do.	Roasted	3	15
Liver, beef's, fresh ..	Broiled	2		Do. do.	Stewed	3	30
Lamb, fresh	Do.	2	30	Beef, fresh, lean, rare,	Roasted	3	

Articles of Diet	Mode of preparation	Time required for digestion		Articles of Diet	Mode of preparation	Time required for digestion	
		H	M			H	M
Beef, fresh, dry.. ..	Roasted	3	30	Soup, barley	Boiled	1	30
Do. steak..	Broiled	3		Do. mutton	Do.	3	30
Do. with salt only ..	Boiled	2	45	Green corn & beans ..	Do.	3	45
Do. with mustard,&c.	Do.	3	30	Chicken soup	Do.	3	
Do. fresh, lean . ..	Fried	4		Oyster soup	Do.	3	30
Do. old, hard, salted,	Boiled	4	15	Hash, meat & vegetable	Warmed	2	30
Pork-steak..	Broiled	3	15	Sausage, fresh	Broiled	3	20
Pork, fat and lean ..	Roasted	5	15	Heart, animal	Fried	4	
Do. recently salted..	Boiled	4	30	Tendon	Boiled	5	30
Do. do.	Fried	4	15	Cartilage	Do.	4	15
Do. do.	Broiled	3	15	Aponeurosis	Do.	3	
Do. do.	Raw	3		Beans, pod	Do.	2	30
Do. do.	Stewed	3		Bread, wheaten, fresh,	Baked	3	30
Mutton, fresh	Roasted	3	15	Do. corn	Do.	3	15
Do. do.	Broiled	3		Cake, do..	Do.	3	
Do. do.	Boiled	3		Do. sponge	Do.	2	30
Veal, fresh..	Broiled	4		Dumpling, apple . ..	Boiled	3	
Do. do.	Fried	4	30	Apples, sour & hard ..	Raw	2	50
Fowls, domestic.. ..	Boiled	4		Do. do. mellow,	Do.	2	
Do. do.	Roasted	4		Do. sweet, do. ..	Do.	1	30
Ducks, do.	Do.	4		Parsnips	Boiled	2	30
Do. wild	Do.	4	30	Carrot, orange	Do.	3	15
Suet, beef, fresh ..	Boiled	5	3	Beet	Do.	3	45
Do. mutton	Do.	4	30	Turnips, flat	Do.	3	30
Butter	Melted	3	30	Potatoes, Irish	Do.	3	30
Cheese, old, strong ..	Raw	3	30	Do. do.	Roasted	2	30
Soup, beef, vegetables, and bread	Boiled	4		Do. do.	Baked	2	30
				Cabbage, head	Raw	2	30
Soup, marrow-bones..	Do.	4	15	Do. with vinegar,	Do.	2	
Do. beans	Do.	3		Do. do.. ..	Boiled	4	30

The following judicious remarks on this Table I quote from a recent and popular work of Dr. Andrew Combe, on the physiology of digestion.

"This table is very interesting, but the results must not be too much relied upon, or regarded as representing the *uniform* rate of digestibility. We have already seen that chymification is greatly influenced by the interval which has elapsed since the preceding meal, the amount of exercise taken, the keenness of the appetite, the state of the health and mind, the completeness of the mastication, the state of rest or exercise after eating, and various other circumstances; and, above all, *the quantity swallowed in proportion to the gastric juice secreted.* And consequently, if an experiment be made without regard to these conditions, and without any thing being recorded except the time occupied in digestion in the individual case, the conclusions deduced from it may be most fallacious. The very aliment which, taken in full quantity, remains on the stomach for hours, may, in a smaller quantity, be entirely digested in one-third of the time. Thus, in the foregoing table, two and a-half hours are set down as the average time required for the chymification of jelly, but in the 41st experiment, we find that eight ounces of that substance were entirely digested in ONE hour. So that, if all the other conditions are not carefully kept in view at each trial, the results cannot possibly be held as conclusive.

It may be said that, on the day of the 41st experiment, St. Martin's digestion must have been particularly good—and, in truth, it seems to have been so; for at 9 o'clock, A. M. he breakfasted on *soused tripe, pig's feet, bread and coffee,* and yet, only *one* hour later, no vestige of any of these savoury things remained in the stomach. What renders this result the more remarkable, is the fact, that, in another table at page 45, a simple breakfast of coffee and bread is set down as having required FOUR hours for its digestion. The rapid disposal of the same elements with the addition of soused tripe and pig's feet, instead of disproving my position, evidently strengthens it, by shewing that, if *from any cause* the digesting power varies in intensity, the result obtained from the experiment on one kind of food, cannot, with any shew of reason, be considered as an accurate index of its rate of digestibility in comparison with that of other kinds.

This neglect of the other conditions is accordingly the circumstance which throws a doubt over the results not only of Dr. Beaumont's experiments, but of those of every other inquirer. Dr. Beaumont indeed candidly admits, that his were performed for the purpose of demonstrating other important principles connected with digestion, and not at all with the view of determining the comparative rates of digestibility of different kinds of aliment; and in alluding to the various requisites for a satisfactory series of experiments, he himself justly states, that this would be a Herculean task, which it would take years to accomplish. In considering the following general results, then, the reader ought to bear in mind that they are only probable and approximative, and not strictly demonstrated or certain.

As a general rule, animal food is more easily and speedily digested, and contains a greater quantity of nutriment in a given bulk, than either herbaceous or farinaceous food; but, apparently from the same cause, it is also more heating and stimulating. *Minuteness of division and tenderness of fibre,* are shewn by Dr. Beaumont's experiments to be two grand essentials for the easy digestion of butcher-meat; and the different kinds of fish, flesh, fowl, and game, are found to vary in digestibility chiefly in proportion as they approach or depart from these two standard qualities.

Farinaceous food, such as rice, sago, arrow-root, and gruel, are also rapidly assimilated, and prove less stimulating to the system than concentrated animal food. Milk seems to rank in the same class, when the stomach is in a healthy state.

The other kinds of vegetable substance are the slowest of all in undergoing digestion, and very frequently pass out of the stomach and through the bowels comparatively little changed; and hence the uneasiness which their presence so often excites in the bowels, especially in persons of weak digestion, owing to the nerves of the intestines having a relation to *digested*

food. In a given bulk they contain less nutriment, and excite the system less, than any other kind of food; so that they are well adapted for the diet of those in whom it is necessary to avoid every kind of stimulus, and who are not subjected to great muscular exertion; but to a person undergoing hard labour, they afford inadequate support.

Liquids—soup, for example—are slow of digestion, and hence are unfit for most dyspeptic patients. Before the gastric juice can act upon them, the fluid mass must be absorbed, and the mass thickened to a proper consistence for undergoing the usual *churning* motion. On examining the contents of the stomach an hour after St. Martin had dined on beef-soup, Dr. Beaumont found that the absorption of the watery part had been carried so far, as to leave the remainder of even a thicker consistence than after an ordinary solid meal. When drink is swallowed, it is carried off in the same way by absorption, and is not digested or allowed to pass through the pylorus. One purpose of this provision seems to be to prevent the gastric juice from being rendered inefficient by too much dilution.

When the food on which an animal lives is of a highly concentrated kind, and contains much nourishment in a small bulk, the apparatus of organs provided for its digestion is on a correspondingly small scale in point of extent. Thus, in carnivorous animals, whose food is, bulk for bulk, the most nutritious of all, the stomach and intestines are simple and short, the latter not exceeding in length more than from one to four or five times that of the body. In herbivorous animals, on the other hand, whose food is sparingly nutritious, and therefore requires to have a large bulk or volume, the stomach, as we saw in a former chapter, is greatly more complicated, and the length of the intestines enormously increased. Man, being intended to feed on both animal and vegetable substances, possesses an organization which holds an intermediate place between the two extremes. In him, neither are the intestines so short as in carnivorous animals, nor have they the complexity and length characteristic of the herbivorous—thus clearly shewing the intentions of Nature in regard to his food, and at the same time allowing him a considerable latitude of adaptation when the force of circumstances for a time denies him access to any variety.

Animal food being in general more quickly digested than vegetable, and a simpler organization being sufficient for its conversion into chyme, many physiologists have inferred that this was owing to its being already of an animal nature, and therefore requiring scarcely any change to fit it for becoming a constituent part of the living fibre. But I agree with Dr. Beaumont in thinking that this explanation is more gratuitous than philosophical, and that the process of chymification implies almost as complete a change in the one instance as in the other. In both, the operation of the gastric juice seems to be entirely analogous. In both, a complete

solution takes place, and the chyle into which animal food is ultimately converted bears no greater resemblance to the future animal fibre, than does that produced from vegetable aliment. Thus the chyle of a horse, which lives exclusively on vegetables, has quite as great a resemblance to its future muscle, as that of a tiger, a lion, or a fox has to *its* future produce. Besides, whether the food be animal or vegetable, the ultimate result of digestion is always the formation of *new animal matter;* but in the former case, the nutritive particles are mixed up with a smaller proportion of innutritious matter than in the latter, and consequently a larger quantity of them can be extracted from a given bulk in a shorter time, than in the case of vegetables. There are most probably also minute differences in the chemical composition of the chyle derived from different kinds of food: but its general nature—its fitness for forming new animal tissue—and that of the process by which it is produced, are always the same.

Animal food, it is true, affords a more stimulating nutriment than farinaceous and other kinds of vegetable aliment, and hence it is avoided in diseases of excitement. But it seems to me that this stimulus is owing not only to its own inherent properties, but also to its more highly concentrated state, and to the much greater quantity of chyle which is derived from it than from an equal bulk of vegetable aliment. From the numerous experiments of injecting water, poisons, and other substances into the veins, performed by Majendie and others, we have direct proofs that the same agent which, introduced rapidly into the system, will sometimes act so powerfully as to destroy life, will excite scarcely any perceptible disorder if introduced very slowly. Analogy, therefore, bears us out in believing that the rapid admixture of very nutritious chyle with the blood may over-stimulate the system, when its more gradual introduction would have produced no such effect. At the same time, there can be no doubt that there is also a greater inherent stimulus in animal than in vegetable aliment.

It seems to be partly for the purpose of obviating the evil of the too rapid introduction of nutriment, and partly for that of varying the stimulus, that Nature has rendered a certain bulk of food advantageous to digestion, and decreed that no animal can long retain its health if fed on highly concentrated aliment alone. Dogs fed on oil or sugar, which are almost wholly converted into chyle, become diseased and die in a few weeks; and, as Dr. Paris has acutely remarked, the very capacity of our digestive organs is a proof that Nature never intended them for the exclusive reception of highly concentrated food. Dr. Paris refers to post-horses fed chiefly on beans and corn, as instances among the lower animals of the insalubrity of too condensed nutriment, and shews that they live constantly on the brink of active disease, and every now and then require bleeding, laxatives, and emollients, to keep them in condition. Sportsmen,

boxers, and others, who train themselves for severe exertion, are additional examples shewing that a similar mode of living induces a morbid tension of the system which cannot be long kept up without danger. The Kamtschatdales sometimes live with impunity for months on fish-oil, by wisely mixing it up with saw-dust or other indigestible vegetable fibre.

If the preceding explanation of the more rapid digestion of animal than of vegetable substances, and the higher stimulus which they afford, be correct, the common notion of the former being more digestible than the latter *solely* because there is a greater analogy between animal food and the system which it goes to nourish, and therefore a smaller change to be undergone, necessarily falls to the ground. If it be true—which it seems to be—that, *in the natural state*, in a temperate climate, animal food is more easily digested than vegetable, the fair inference ought rather to be that the system requires the former in larger proportion than the latter, and that the gastric juice is purposely constituted with reference to this circumstance. Accordingly, in the Arctic Regions, where the climate renders great stimulus necessary, animal food, of to us the most indigestible kind—that consisting of pure fat and oil—is eaten in immense quantities, and digested with enviable facility; while in India and other tropical climates, where much less stimulus is required, the natives digest vegetable aliment with at least equal ease and satisfaction.

If, as Dr. Paris imagines, animal food owes its digestibility simply to its possessing 'a composition analogous to that of the structure which it is designed to supply,' and therefore requiring 'little more than division and depuration,' instead of the alleged 'complicated series of decompositions and recompositions which must be effected before vegetable matter can be animalized or assimilated to the body,'*—it follows that butcher-meat must in all climates and situations be more digestible than vegetables; and that *raw* meat, which has the greatest analogy of all to the structure of the body, must require still less digestive power for its solution and assimilation than cooked meat. These propositions, however, are wholly at variance with experience: in particular, the effect of cooking is unquestionably to induce a change of composition subversive of the analogy on which Dr. Paris rests his opinion.

That the easier digestibility of animal food in man arises chiefly from its greater adaptation to the qualities of the gastric juice, and not from any such analogy as that now alluded to, is rendered still more probable by the fact, that in him the gastric fluid contains scarcely any free acid, except where the diet has consisted for some time principally of vegetables; whereas it always contains a considerable proportion of acid in herbivorous creatures. In the latter, moreover, the analogy is quite as great between animal substances and their own structure as in man, and yet to a cow,

* Paris on Diet, p. 93.

beef is much more indigestible than grass, notwithstanding the 'decompositions and recompositions' which the latter is supposed to require before becoming animalized. Dr. Beaumont is therefore quite justified in maintaining, that the process of digestion implies as complete a solution and recomposition in the case of animal as of vegetable substances; and that the rapidity with which the chymification of either is effected *depends more on its adaptation to the properties of the gastric juice provided by Nature for its solution, than on the closeness of resemblance of its own composition to that of the body of which it is to become a part.*"

ON

MORBID SENSIBILITY

OF THE

STOMACH AND BOWELS,

ATTENDED WITH OBVIOUS DISORDER IN THE DIGESTIVE ORGANS.

I HAVE stated that morbid sensibility or excitability of the gastric and intestinal nerves may be divided into two orders or classes, viz.—that in which there is *sensible* pain, irritation, or other disorder in these organs, as well as various sympathetic affections, mental and corporeal, dependent on them—and that, in which the morbid sensibility or irritability of the digestive apparatus is, as it were, masked, and only shews itself in a variety of morbid feelings and conditions of other organs and parts, as well as in the intellectual functions. The *first* class or order has been much more accurately investigated than the *second*—and, therefore, I shall content myself with a very brief view of the prominent features of the first order.

SECT. IV.—PHENOMENA OF REPLETION.

THE phenomena which supervene on the introduction of *too large a quantity* of food and drink into the stomach, have been sometimes confounded with the symptoms of indigestion, to which indeed they bear considerable resemblance. Thus, a man in perfect health, and with an excellent appetite, is allured by variety of dishes, agreeable company, provocative liquors, and pressing invitations, to take food more in accordance with the relish of appetite than the power of digestion. No inconvenience occurs for an hour or two; but then the food appears to, and actually does, swell in the stomach, occasioning a sense of distention there, not quite so pleasant as the sensations attendant on the various changes of dishes, and bumpers of wine, or other drink. He unbuttons his waistcoat, to give more room to the labouring organ underneath: but that affords only temporary relief. There is a struggle in the stomach between the *vital* and the *chemical* laws, and eructations of air or acid proclaim the ascendancy of the latter. The nerves of the stomach are irritated by the new and injurious compounds or extrications, and the digestive power is still farther weakened. The food, instead of being changed into bland and healthy chyme in a couple or three hours, and thus passed into the duodenum, is retained for many hours in the stomach, occasioning a train of the most uneasy sensations, which I need not describe, but which amply punish the

transgressor of the laws of Nature and temperance. Instead of sound sleep, the Gourmand experiences much restlessness, and what is called *fidgets*, through the night—or, if he sleeps, alarms his neighbours with the stifled groans of the night-mare. In the morning, we perceive some of those sympathetic effects on other parts of the system, which, at a later period of the career of intemperance, play a more important part in the drama. The head aches—the intellect is not clear or energetic—the eyes are muddy—the nerves are unstrung—the tongue is furred—there is more inclination for drink than food—the urinary secretion is turbid, or high-coloured—and the bowels very frequently disordered, in consequence of the irritating materials which have passed into the intestinal canal imperfectly digested. This can hardly be called a fit of indigestion, though, even here, we find many of the leading phenomena which afterwards harass the individual without such provocation. It is a fit of repletion, or *intemperance*, strictly speaking, and repetition seldom fails, in the end, to induce that morbid sensibility or irritability of the stomach and bowels which forms the characteristic feature of indigestion.

I have called the above a *fit of repletion or intemperance*, and, of course, it is rather an extreme case, though by no means very uncommon. Nine-tenths of civilized society commit more or less of this intemperance every day. The over-distention and the inordinate daily stimulation weaken the powers of the stomach, in the end, according to a law universally acknowledged in physiology. Any organ that is *over-exerted* in its function, is, sooner or later, weakened—nay the remark applies to the whole machine. Nothing is more common than to see originally good constitutions, broken up prematurely by inordinate labour, whether of body or of mind. The *debility* thus induced, whether of a part or of the whole machine, is invariably accompanied by *irritability*. The *former* has been recognized, in all ages, as the parent of the *latter*. In this way a MORBID SENSIBILITY may become established in the digestive organs; but it does not require a sumptuous table and a variety of wines to induce the above-mentioned phenomena. In every class of society down to the very lowest, the quality or quantity of food and drink is perpetually offending, more or less, the nerves of the stomach and bowels, and thus producing the same phenomena as among the rich, though modified by their habits of life. If we do not find among the lower classes the same amount of hypochondriacal and nervous affections, we observe a still greater proportion of purely corporeal maladies, as organic diseases of the stomach, lungs, heart, liver, and other parts, occasioning a far greater range of mortality than in the upper classes. Besides, the numerous other causes of a moral and physical nature which lead to this condition of the digestive organs, are found operating among all classes, without exception.

If then, when in health, we experience any degree of the foregoing symptoms after our principal meal—if we have a sense of distention, eruc-

tations, disturbed sleep, with subsequent languor of body or mind, there was intemperance in our repast, if that repast did not amount to two ounces of food, or two glasses of wine. But confirmed INDIGESTION is not so much induced by this violence habitually offered to the stomach, as by the re-action of other organs (whose functions have been disturbed sympathetically) on the organ of digestion. The nervous system and the liver repay with interest, after a time, the injuries they sustain from the stomach. The gastric fluid, so much under the influence of the nerves, becomes impaired—the hepatic secretion vitiated—and then the phenomena of morbid sensibility and of indigestion gradually acquire a higher degree of intensity, by the additional sources of irritation, thus generated, multiplied, and reflected from one organ on another. Add to these, the effects of the mind on the body—where moral causes are out of the question, and where the morale is solely troubled by the physique.

SECT. V.—PHENOMENA OF DYSPEPSIA AND INDIGESTION.

BEFORE proceeding to an analysis of particular symptoms which I conceive to be indicative of the MORBID SENSIBILITY now under investigation, it may be proper to exhibit a general sketch of the more prominent phenomena attendant on this class of complaints. They may be divided into those which appertain to the digestive organs themselves, and those which are sympathetic or affecting distant parts.

The first division will be found to include those phenomena which have just been shewn to arise during a *fit of repletion*, or intemperance —affording a proof that REPLETION is at least one of the many causes or steps which lead to indigestion, and its characteristic condition, MORBID SENSIBILITY. It must be remembered, however, that in no individual can we expect to find the whole of the symptoms here enumerated, though few dyspeptics will fail to exhibit a considerable number of them.

At a certain period, varying from half an hour to two hours, after food, more especially after dinner, but often after breakfast or tea, the individual experiences a sense of uncomfortable FULNESS in the stomach. Of all symptoms, this is the most common and the most constant. It increases during the progress of imperfect digestion, and evidently depends on the swelling of the food in the stomach, or the disengagement of air or gas. It is often accompanied by a sense of weight, and also constriction, as if the clothes were too tight round the body. Females are then glad to unloose their stays, which gives a temporary relief. HEARTBURN is not an unfrequent sequence, and then discharges of air and acid, the

latter burning the throat, and causing a very uneasy sensation from the cardiac orifice of the stomach up to the palate. The eructations are often very *rancid*, especially if oily or fat food have been taken. A feeling of disgust, or even nausea, not unfrequently takes place; and, where the nerves of the stomach are in a very irritable state, vomiting of half-digested aliment occurs. In some people there is even a sense of tightness in the chest, impeding the free action of breathing, partly depending on the distention of the stomach. Headache, giddiness, faintness, are occasional attendants on this state of the stomach. When the organ is thus distended, there is not only tenderness on the least pressure at the pit of the stomach, but often actual pain there, till the organ is evacuated either by vomiting, or by the completion of the first digestion. In others, a ravenous appetite exists, which can scarcely be appeased—a sense of emptiness or sinking soon succeeding to fulness and distress.

Some or many of these symptoms continue to annoy the individual for several hours; and even when the food has passed, in a more or less digested state, into the duodenum, the individual is harassed with flatulence and most uncomfortable distention in the bowels. In many cases, indeed, the duodenum is even more morbidly sensible than the stomach, and during the passage of the nutriment through that organ the sufferings are far more tormenting than during the digestion in the stomach. This is not at all wonderful, when we consider that it is into this bowel the bile is first poured, and that the bile is generally depraved in this class of complaints. The duodenum is also more exquisitely sensible than the stomach itself, and is more productive of remote and mysterious sympathies.

After a long and painful digestion then, and passage of the chyme along the upper bowels, there is either an irritable or torpid state of the colon to be contended with. Very many are unable to get free evacuations without assistance; while others are teased with several inefficient motions, a sense of something left behind being still felt. In such cases, the motions are rarely natural and formed, being generally of various colours and consistences, from white to jet black, forming a heterogeneous mixture of slime, bile, glairy mucus, lumps, or a pultaceous and tenacious mass like yeast, exhaling an unnatural odour. There are often long white stringy substances like fat passed, which are erroneously thought to be pieces of worms.

It is a curious fact, that, when the above-mentioned symptoms are strongly marked, and very distressing in the stomach and bowels, the sympathetic effects on remote parts of the body, and also on the mind, are far less than where there is merely MORBID SENSIBILITY in the first passages, attended with few of the phenomena described as indicating what is called indigestion. But more of this hereafter.

When this digestion is finished, and the fæcal remains discharged, the dyspeptic patient has often an interval of comparative comfort, till the same train of symptoms is renewed the next day. But too often the sleep is disturbed with harassing dreams or night-mare, and the individual rises in the morning, quite unrefreshed, with smarting eyes, thickly coated, or even a dry rough tongue, bitter taste in the mouth, languor, irritability, despondency, and little or no relish for breakfast.

Now, on reviewing the foregoing phenomena, there is not one of them which does not indicate DEBILITY and IRRITABILITY of the stomach and bowels. The distention, the extrication of gas, the acid and rancid eructations, prove that the digestive power of the stomach is *weakened;* while all the various uneasy sensations felt in the line of the alimentary canal evince the morbid sensibility or excitability of its nerves.

It may appear an incongruity to consider the organic sensibility or irritability of the stomach and bowels as morbidly increased, at a time when the latter (the bowels), are generally supposed to be in a state of torpor, as evinced by constipation. But the *organic sensibility* of the bowels may be greatly perverted and exalted, and yet the muscular or peristaltic action irregular or even torpid; for it is well known that the nerves of motion and of sensation are not the same. Besides, it is a law of the animal economy, that when nervous sensibility is too much exalted in one part, it is too little so in some other. Thus, we often see the stomach and upper bowels in a state of great irritability, whilst the lower bowels are quite torpid, and will not propel forward their contents. Gastric irritability and vomiting are usually accompanied by constipation. Finally, I may observe that the *functions* of the stomach, liver, and intestines, may be *torpid,* while the *organic* sensibility of their nerves may be in a state of morbid excitement. We see the functions of most organs suspended when they are in a state of inflammation, which must be accompanied by a state of excitement of their nerves; and the same may be said of irritation. Very often, however, constipation is not an accompaniment of morbid sensibility of the stomach and upper bowels. The large intestines are not unfrequently in a state of irritation as well as the small.

All the exciting or occasional causes, physical and moral (which will be presently enumerated), are such as produce unequivocally this state of *debility and irritability;* while all the remedies that remove this disordered condition of the digestive apparatus, are precisely such as lessen irritability and restore tone to the organs. On this account, I think I am fully authorized to conclude that MORBID SENSIBILITY is a characteristic condition which is seldom if ever absent, in what is called indigestion, or dyspepsia. It will be proved that the same condition often obtains where the common phenomena of indigestion are wanting, and where the effects of this MORBID SENSIBILITY are only felt in distant parts of the body, and in the mental

functions. Before proceeding to the latter subject, I will venture to make some remarks on individual symptoms, and on some popular opinions and doctrines drawn from these symptoms.

The progressive march of the disorder has been artificially divided into stages, and considerable importance attached to the division. The marks by which the stages are supposed to be cognizable do not appear satisfactory to me, or accord with my own observations. Dr. Philip lays down a deviation from healthy appearance in the motions as marking "an important step in the progress of the malady." "It (the alvine discharge) sometimes contains," says Dr. Philip, "uncombined bile, sometimes it chiefly consists of bile; its colour, at other times, is too light, more frequently too dark, at length almost black; at different times it assumes various hues, sometimes inclining to green, sometimes to blue, and sometimes it is mixed with, and now and then wholly consists of undigested bits of food." If these be marks of an important step in the progress of indigestion, I can only say, that the above conditions of the biliary and other secretions—may often be seen where there is no proof of indigestion at all, and that they are frequently absent, when there is the highest degree of indigestion, or at least of dyspepsia. That they mark a *disturbance or disorder in the hepatic function*, there can be no doubt; but that they are necessary attendants on any *particular stage* of indigestion, I cannot admit, consistently with my own observations.* The functions of the liver, indeed, and the stomach are so intimately linked, that a derangement of one organ, and especially of the liver, is very commonly productive of derangement in the other, and it is difficult to say, in many cases, which has the priority. The appearance of the alvine discharge is, unquestionably, one of the best indications of the state of the hepatic function, but I cannot admit that it is so good an index of what are called nervous and general dyspeptic symptoms, as Dr. Philip seems to consider it.

When this combination of gastric and hepatic disorder obtains, whichever may have had the priority, the term "INDIGESTION" is merely a conventional term, which is meant to designate a complication, in which indigestion forms at most but a part—and sometimes no part at all. I own that it is hard for any one but a German to give such a name to this complication as may convey a clear idea of its nature. By the term "MORBID SENSIBILITY OF THE STOMACH AND BOWELS," I mean a disordered condition of the gastric and intestinal nerves, in which their natural sensibility is changed, being morbidly acute, for the most part, or otherwise perverted. By this term, I merely designate a fact or condition which, in my opinion, obtains much more generally in this class of maladies than the state called indigestion—indeed, I think I may aver, that it is never absent in the

* For additional proof, see Abernethy, p. 72, *et seq.* See, also, Mr. Cooke's work on Indigestion.

functional disorders of the digestive apparatus now under review, and that it forms the connecting link between these disorders, and the various sympathetic affections of other and distant parts of the system. This is my apology for the term.*

When the combination of liver and stomach affection is established, we have a train of well-marked phenomena indicative of their co-existence. The appetite is fickle, being sometimes ravenous, at others almost annihilated, and sometimes whimsical. Whatever is eaten produces more or less of distention, discomfort, or even of pain in the stomach, the duodenum, or in some portion of the alimentary canal, till the fæcal remains have been evacuated. On this account the bilious and dyspeptic patient is very anxious to take aperient medicine, as temporary relief is generally experienced by free evacuations. I say *temporary* relief; for purgation will not remove the cause of the disease; it only dislodges irritating secretions, soon to be replaced by others equally offensive. Indeed, the usual routine of calomel at night and black-draught in the morning, if too often repeated, will keep up rather than allay irritation in the bowels, and produce, as long as they are continued, morbid secretions from the liver and whole intestinal canal. It is astonishing how long scybala and irritating undigested matters will lurk in the cells of the colon, notwithstanding daily purgation. Many instances have come to my knowledge, where portions of substances, eaten two, three, and four months previously, have at length come away in little round balls, enveloped with layers of inspissated mucus, or in a black kind of powder, or thin lamina like tea-leaves soaked. These scybala or undigested matters keep up an *irritation*, generally without any

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* Since the third edition of this Essay was printed, I observe, in a work of Professor Schmidtman, of Berlin, on Dyspeptic Affections, published in 1826, the following passage, which is completely in accordance with the doctrine which I have endeavoured to maintain in this Essay.

"Quantum investigando (says he) et cogitando potui assequi, cardialgia primaria (by which he designates dyspepsia) *semper fundatur in nimia et immodica ventriculi sensibilitate.* Absente tali causa, ut mihi videtur, morbus vix oritur."—SUMMA OBSERVATIONUM MEDICARUM EX PRAXI CLINICA TRIGINTA ANNORUM DEPROMTARUM. Berlin, 1826.

It is also curious, that a French physician (M. Barras) who, like the Author of this Essay, was a severe sufferer from dyspepsia, in some of its worst forms, comes to the very same conclusion respecting the true nature of the disease—MORBID SENSIBILITY of the gastric and intestinal nerves. "Alors (says he), la maladie ne parait consister que dans une MOBILITE EXTRAORDINAIRE de l'appareil sensitif, et elle n'a pour principal symptome, que L'ABERRATION DE LA SENSIBILITE et des fonctions de cet appareil."—*Traité des Gastralgies et des Enteralgies.*

The German physician resided a long time in a country where stomach affections were particularly prevalent, and, therefore, had ample experience in the complaint. The French and English writers suffered in their own persons; and this identity of ideas must surely prove a very strong argument in favour of the truth of the doctrine embraced by all three in different and widely distant countries.

distinct pain, in the bowels; and the effects of this irritation are manifested in distant parts by the most strange and anomalous sensations that appear to have no connexion with the original cause. The practitioner is thrown off his guard by the belief that, after repeated cathartics which scour the bowels, there cannot be any thing left there. But this is a great mistake. It is not the most powerful purgative that clears the bowels most effectually. If irritation be first allayed by hyosciamus or other anodyne, and then a mild cathartic exhibited, the evacuations will be much more copious than if the most drastic medicines are exhibited without previous preparation.

In addition to the various appearances of the motions, as described by Dr. Philip, I may add that, although the liver is often very torpid in this disease, and consequently the fæces of a clay-colour and devoid of natural smell; yet there is, in many cases, a copious secretion of viscid bile, which appears either distinct in the motions, or, when incorporated with them, renders them as tenacious as bird-lime. It is exceedingly difficult to separate these motions from the bottom of the utensil by affusions of water. It is this tenacious ropy bile which hangs so long in the bowels of some people, and, by keeping up a constant irritation of the intestinal nerves, produces a host of uneasy sensations in various parts of the body, as well as fits of irritability in the mind.

In some cases, where this poisonous secretion lurks long in the upper bowels, the nerves of which are so numerous and the sympathies so extensive, there is induced a state of mental despondency and perturbation which it is impossible to describe, and which no one can form a just idea of, but he who has felt it in person. This poison acts in different ways on different individuals. In some, whose nervous systems are not very susceptible, it produces a violent fit of what is called bilious head-ache, with excruciating pains and spasms in the stomach and bowels, generally with vomiting or purging, which is often succeeded by a yellow suffusion in the eyes, or even on the skin. Severe as this paroxysm is, the patient may thank his stars that the poison vented its fury on the body instead of the mind. Where the intellectual faculties have been much harassed, and the nervous system weakened and rendered irritable, the morbid secretion acts in that direction, and little or no inconvenience may be felt in the real seat of the offending matter. The mind becomes suddenly overcast, as it were, with a cloud—some dreadful imaginary or even unknown evil seems impending; or some real evil, of trifling importance in itself, is quickly magnified into a terrific form, attended, apparently, with a train of disastrous consequences, from which the mental eye turns in dismay. The sufferer cannot keep in one position, but paces the room in agitation, giving vent to his fears in doleful soliloquies, or pouring forth his apprehensions in the ears of his friends. If he is from home when this fit comes on he hastens back—but soon sets out again, in the vain hope of running from

his own wretched feelings. If he happen to labour under any chronic complaint at the time, it is immediately converted (in his imagination) into an incurable disease; and the distresses of a ruined and orphaned family rush upon his mind and heighten his agonies. He feels his pulse, and finds it intermitting or irregular—disease of the heart is threatened, and the doctor is summoned. If he ventures to go to bed—and falls into a slumber, he awakes in the midst of a frightful dream, and dares not again lay his head on the pillow. This state of misery may continue for 24, 36, or 48 hours; when a discharge of viscid, acrid bile, or other vitiated secretion, dissolves, at once, the spell by which the strongest mind may be bowed down to the earth, for a time, through the agency of some irritating material on the intestinal nerves! Or it may go off without any evacuation of offending matter, leaving us in the dark as to the cause of such a series of distressing phenomena. I believe such a train of symptoms seldom obtains, except where there has been a *predisposition* to morbid sensibility, occasioned by mental anxiety, vicissitudes of fortune, disappointments in business, failure of speculations, domestic afflictions, too great labour of the intellect, or some of those thousand moral ills, which render both mind and body so susceptible of disorder.

Were I at liberty, I could relate some almost incredible examples of the extent to which the most towering intellect may be subjugated by an ignoble enemy in the shape of a corporeal disorder. I lately saw a gentleman of brilliant talents and prolific genius, who could sit down and write extemporaneously, whole pages of superior poetical effusions, with scarcely an effort of the mind, and who would yet, from a sudden derangement of the digestive organs, be so completely and quickly prostrated in intellectual power, as not to be able to write three lines on the most common subject. On a late occasion, when he had merely to communicate an official transaction that required not more than half a dozen lines in the plainest language, he could not put pen to paper, though the attempt was fifty times made in the course of two days. At length, he was forced to throw himself into a post-chaise and perform a long journey, to deliver orally what might have been done, in one minute, by the pen. In half an hour after this task was performed, he sat down and wrote an ode descriptive of his own state of nervous irritability, which would not have done discredit to the pen of a Byron!

The Author of this Essay has, himself, been so enervated by a fit of what is called indigestion, as to be utterly incapable of breaking the seal of a letter for twenty-four hours, though, to all appearance, in good health at the time. Equally astonishing and unaccountable is the degree of timidity, terror, incapacity, or whatever other magic-like spell it is, which annihilates, for a time, the whole energy of the mind, and renders the victim of dyspepsia afraid of his own shadow—or of things more unsubstantial (if possible) than shadows! It is not likely that the great men of this earth should

be exempt from these visitations, any more than the little; and, if so, we may reasonably conclude, that there are other things besides CONSCIENCE, which "make cowards of us all"—and that, by a temporary gastric derangement, many an enterprise of "vast pith and moment" has had its "current turned awry," and "lost the name of action." The philosopher and the metaphysician, who know but little of these reciprocities of mind and matter, have drawn many a false conclusion from, and erected many a baseless hypothesis on, the actions of men. Many a happy and lucky thought has sprung from an empty stomach! Many an important undertaking has been ruined by a bit of undigested pickle—many a well-laid scheme has failed in execution from a drop of green bile—many a terrible and merciless edict has gone forth in consequence of an irritated gastric nerve! The character of men's minds has often suffered from temporary derangements of the body; and thus, health may make the same man a hero in the field, whom dyspepsia may render an imbecile in the cabinet!*

In some constitutions, especially where there has been gout in the family, or some hereditary disposition to disease, these attacks of vitiated secretion in the glandular organs of the digestive apparatus, seem almost necessary from time to time, to clear, as it were, the constitution, like paroxysms of gout itself. It is hardly possible, in such cases, to prevent entirely the recurrence of these storms, even by the strictest attention to diet, regimen, and medicine; but, if these precautions are not taken to restrain the violence and lengthen the intervals, the attacks become dangerous, and derangement of function may ultimately end in disease of structure. On this account, people should not consider their temperance and vigilance as thrown away, because these periodical visitations cannot be entirely prevented by the most skilful physicians. Every thing in this world is good or bad by comparison. There is a defect in such constitutions, whether hereditary or acquired, and they must be contented with keeping such defect in check, and preventing its assuming a much worse form than that in which it presents itself.

It is under the influence of such paroxysms as these, I am thoroughly convinced, that nine-tenths of those melancholy instances of suicide, which shock the ears of the public, take place. Nothing is more common than to hear of these catastrophes, where no ostensible cause could be assigned for the dreadful act. There might be no real moral cause—but there was a real physical cause for the momentary hallucination of the judgment, in the irritation of the organ of the mind, very often through sympathy with

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* Since the seventh edition of this work was printed, a highly-gifted patient, residing not a thousand miles from Abbotsford, sent me a passage from the writings of Voltaire, containing an almost identical sentiment. I can conscientiously declare that I did not copy from Voltaire.—*9th Ed.*

the organs of digestion. Such is the intimacy of connexion, and reciprocity of influence between the intellectual and corporeal functions!

The foregoing is a sketch of a high degree of biliary irritation acting on the mental faculties through the medium of the intestinal nerves. But there are a thousand shades of this irritation displaying themselves more in the temper or moral character, than in the corporeal functions. These I cannot at present stop to delineate, as they will be alluded to further on.

In the complicated disease under consideration, there are various functions disturbed, and phenomena produced, which are all referrible to one common source. The tongue is furred, or white, especially in the middle and at the root, and, when there is much irritation in the stomach or duodenum, the papillæ are elevated, and the edges and tip red. There is often a disagreeable taste in the mouth, especially in the mornings; and some people complain of a peculiar sense of constriction at the root of the tongue and about the fauces, which cannot be accounted for on any other principle than that of sympathy with the stomach. The mouth feels clammy, and there is a heavy odour on the breath. The clean red and shining tongue, whether moist or dry, is indicative of serious irritation, if not inflammation, in the lining membrane of the stomach or bowels. It resembles a beef-steak, or a dissected muscle.

The eye may or may not be tinged yellow; but there is a peculiar muddiness or lack-lustre in the coats of that organ, with an expression of languor or irritability in the countenance, with sense of weakness, especially about noon, which are singularly characteristic of the malady, and indicate, with unerring certainty, its existence to the experienced physician. In people beyond the age of 45, there is usually a greater defect of vision, particularly by candle-light, when the digestive organs are disordered, than when the functions of the stomach and liver are in good condition.* The urinary secretion is generally disturbed—being either turbid, or high-coloured, with more or less of pink or white sediment, or with an oily kind of film floating on the surface. It is, for the most part, however, rather scanty than otherwise, with occasional irritation in passing it. Sometimes, when the individual is in a state of nervous irritation, it is as limpid as pump-water, made every half-hour, and in large quantity in the aggregate. It is curious that this clear and insipid water, should be more irritating to the bladder than the most concentrated and highly saline urine. The individual cannot retain more than a few spoonsful at a time, without great inconvenience.

The skin and its functions are very much affected in bilio-dyspeptic complaints. It is either dry and constricted, or partially perspirable, with

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* Many cases of *muscæ volitantes*, and other spectral illusions, are clearly dependent on gastric and intestinal irritation, of which I have seen some curious examples. Mr. Abernethy has related an instance of these visual deceptions in his own person.

feelings of alternate chilliness and unpleasant heat, especially about the hands and feet. The skin, indeed, in these complaints, is remarkably altered from its natural condition; and the complexions of both males and females are so completely changed, that the patients themselves are constantly reminded, by their mirrors, of the derangement in the digestive organs. The intimate sympathy between the external surface of the body and the stomach, liver and alimentary canal, is now universally admitted, and explains the reciprocal influence of the one on the other. Many of the remote causes, indeed, of indigestion and liver-affection will be found to have made their way through the cutaneous surface. On the other hand, the great majority of those eruptions on the skin, which disfigure the countenance and cause so much irritation and suffering in various parts of the body, are now clearly traced to disorder in the stomach and bowels. The purely local treatment of these cutaneous affections, by external applications, is generally ineffectual; whereas a restoration of healthy function in the digestive organs, is almost sure to remove them, with the aid of a very few outward applications.

One of the most striking phenomena attendant on derangement of function in the liver and alimentary canal, is loss of flesh and of muscular power. The emaciation is easily accounted for by the deficient supply of nutriment from an imperfect apparatus: and, it is not a little remarkable, that the liver-affection accelerates the loss of flesh much more than the stomach-complaint. The symptoms of dyspepsia may be very severe indeed, and yet emaciation will be very trifling; but let the function of the liver be much disturbed, and the flesh disappears with great rapidity. This is a strong proof that the bile is essential to the change of our food into healthy chyle, as the experiments of Sir B. Brodie shew.

But the loss of strength, in this complaint, is out of all proportion to the waste of flesh. This is one of the most characteristic features of the disease, and is much more connected with nervous irritation in the stomach and bowels than with disorder of the liver. I have seen this prostration of strength in the highest degree where the biliary secretion was perfectly healthy, but where the nerves of the primæ viæ were extremely irritable. It is a *sense* of debility rather than actual debility. It is infinitely more distressing than real weakness. The least exertion, even that of stooping to take up a book, or stretching out the arm to take hold of any object, will cause such a feeling of inability for muscular action as quite depresses the spirits of the individual. Yet, perhaps, in less than three hours after this, when the food has passed from the stomach, or its residue from the bowels, or from some cause unknown, or perhaps connected with certain conditions of the atmosphere, the same individual will be capable of walking a mile with comparatively little fatigue. This is a point which should be particularly inquired into, when questioning the patient; for the state above described is not one of direct or real de-

bility, but of temporary depression. The patient may, it is true, be much weaker than when in health; but true debility is uniform, and proportioned to the decrease of muscular fibre: whereas, the distressing sense of debility now under consideration, is out of all proportion to the emaciation—is not uniformly the same—and is almost always greater when there is food in the stomach, or bad secretions in the bowels, than when both stomach and bowels are empty. It is, in appearance, a sympathetic debility, or temporary loss of power, from nervous irritation in the alimentary canal, however induced. The distinction between these two kinds of debility is the more necessary, as the treatment is somewhat different. Bark, wine, rich food, and tonics, are not the remedies for debility arising from gastric and intestinal irritation. The wretched feeling from this source is exasperated rather than relieved by tonics and stimulants, unless very carefully employed in combination with soothing medicine, and diet of very easy digestion. There is another kind of depression, or sinking, which is obviously referred to the stomach, and only takes place when that organ is empty. This is a very different sensation from that which has been described, and is relieved by food or cordial drink.

In respect to a symptom on which much stress has been laid by Dr. Philip, as marking an important stage of indigestion, namely, tenderness at the pit of the stomach, *on pressure*, some observations have been made in another part of the work.* That it exists in every stage of indigestion, I venture to affirm—and I will go one step further, for I have no hesitation in averring that, if a whole regiment of soldiers were turned out, and the region of the stomach pressed with the pointed fingers, and with the force which Dr. Philip uses, they would all wince, from the General downwards. With the following observation of Dr. Philip, I most cordially agree:—"The patient, in general, is not aware of this tenderness till it is pointed out by the physician." As for its being any criterion of organic disease in the liver, I have, in another part of the work, expressed my conviction in the negative—and that it is generally characteristic of an inflammatory state, or incipient organic disease of the pyloric orifice of the stomach, I cannot, for several reasons, admit. One of these reasons is, that there is often much more tenderness in the epigastrium, in functional disorder, than in actual and unequivocal organic disease, as in scirrhus of the pylorus, for example. Another reason is, that this tenderness in the epigastrium is frequently, if not generally, relieved by bitters and mild tonics, with light animal food, which would hardly be the case if it depended on inflammatory action or incipient change of structure. A third reason is, that the dyspeptic patient in whom this tenderness is

* See the section on *organic disease of the liver* at page 288.

so conspicuous, is proverbial for long life, and dies, at last, without any organic disease of the stomach. Let Dr. Philip himself bear witness. "It is a curious fact," says he, "and one of the greatest importance in the treatment, *that the organic affection rarely takes place in the original seat of the disease*, but in other organs with which the stomach sympathises." This is a slippery doctrine; for it must for ever elude the proofs afforded by the scalpel. If the patient die of tubercles in the lungs, abscess in the brain, aneurism of the heart, enlargement of the liver and its consequences, or any other organic disease, dyspepsy having previously existed, we have only to say that the inflammatory action and change of structure began in the stomach, but shifted its seat and ended in a distant part. "Thus," says Dr. Philip, "when the body is examined after death, the patient *is said* to have died of disease of some of these parts, and there is nothing in the appearance of the organs to distinguish such affections from diseases which originate in the organs themselves." It would be very easy to turn the arms of this doctrine against itself. Organic disease of the brain, for example, very frequently shews itself more, especially at an early stage, in disordered function of the stomach, than in disordered function of the intellect—and, at such period, the patient would be said to labour under indigestion. But, as the malady advances, the functions of the brain and nervous system become unequivocally disturbed, and then it might be said the disease was extending itself sympathetically to the organ of the mind. At length, on death taking place, the brain would be found disorganized, and the stomach sound; when Dr. Philip would ingeniously explain the matter by the above mode of reasoning. Again, if sympathetic affections end so frequently as Dr. Philip imagines in organic disease, how is it that, in fatal affections of the brain from chronic disorganization, where the functions of the stomach are proverbially deranged from sympathy with the sensorium (all sympathies being reciprocal), we so rarely find any organic change in the stomach? Illustrations of this remark are innumerable. I may only just allude to a remarkable instance lately published by Dr. Chambers, and attended by myself, where a large tubercle growing in the brain shewed all, or almost all, its bad effects on the stomach for a great length of time; indeed, to the very hour of death; and yet, on dissection, the stomach was found healthy, and the seat of disease in the brain. In short, while I agree with Dr. Philip, that every part of the body sympathises readily with the stomach, whether in health or in disease, I do contend, from attentive observation and long experience, that these sympathetic affections of distant parts end, comparatively speaking, but rarely, in organic disease; and, consequently, Dr. Philip's doctrine is calculated to excite a great deal too much alarm in the mind of the patient, as well as in that of the experienced practitioner. As Dr. Philip contends for inflammation as the pathognomonic character of indigestion in its second stage, it was incumbent on him to shew all the proof of which

the case is susceptible. He acknowledges that when the patient dies, it is of the organic disease in a remote part, which was originally only sympathetic of the disease in the digestive apparatus, the latter being no longer the seat of disease, and, consequently, exhibiting no alteration of structure on dissection. So far, so good. But, as indigestion, in all its stages, is one of the most common diseases which we meet; and as numbers of people are daily dying suddenly of other diseases or accidents, *during the second stage of indigestion*, why does not Dr. Philip bring forward proofs of inflammation and incipient organic disease of the digestive apparatus, existing in that stage, as developed by dissection? This is the way in which we arrive at the knowledge of incipient changes of structure in other diseases not mortal in their early stages. But Dr. Philip offers us no such proof, and the conclusion is, that he cannot. It will hardly be considered an answer to this objection, that the pyloric orifice of the stomach is often found indurated in dram-drinkers. No one can deny that disease of the stomach may be brought on by such practices; but these cases have little analogy with the common dyspepsia so prevalent in civilized life, where intemperance is on a very moderate scale. I have admitted more than some physicians will admit,* that sympathetic affection of the chest, from disorder of the liver and digestive organs, may and does end occasionally in organic disease. But we must recollect that disease of the lungs destroys nearly a fourth of the population, and that it is highly probable that latent tubercles existed previously to the disorder of the stomach, in almost all those who die of dyspeptic phthisis. The disease is, therefore, *called into action* rather than *produced* by the disorder of the digestive organs. Perhaps, the same observation may partly apply to the other organic diseases *sympathetically* called forth.

But to return to the subject of tenderness at the epigastrium. I contend, for the reasons already stated, and for many others which I could adduce, that it is owing to *irritation* rather than inflammation, in a great majority of cases, and, consequently, that it is no criterion of the latter disease in this class of complaints. The indiscriminate application of leeches for its removal, has, to my knowledge, very often aggravated the disease. The counter-irritation of a blister or tartar-emetic plaster is far more effectual, and harmonizes with the true nature of the tenderness—*morbid sensibility* of the gastric and duodenal nerves. In my own person, and those of many others, I clearly ascertained this point, and found that tonics and bitters more effectually relieved this tenderness than leeches and blue-pill.

The same may be said of *pain* in the stomach, independent of pressure, of which, by the bye, Dr. Philip takes no notice, in the second stage of

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* See Dr. Paris, for example, who denies that there is, or can be, any such thing as dyspeptic phthisis.

indigestion. This is a very common feature of the disease; but affords no criterion of the existence of inflammation. On the contrary, it is far more severe in functional disorder than in unequivocal inflammation of the stomach, and is relieved, as every one knows, by tonics and even stimulants, rather than by leeches or depletion. It is not a little remarkable, that Dr. P. should bring forward pain on strong *pressure* as indicative of inflammation, while he passes over severe pain, which is so very commonly complained of *independent* of pressure. But the fact is, that neither tenderness nor pain in the stomach of a dyspeptic patient affords any proof of inflammation in that organ.

Of the fulness at the epigastrium I shall speak more in the second part of this Essay, and endeavour to shew that it is often more apparent than real, being produced by the emaciation so common in this class of complaints. That it is usually noticeable in indigestion I admit; but that it marks any particular period or stage of the disease I never could discover. It is, I believe, much more frequently the effect of flatus than of organic disease.* If the liver be enlarged, so as to cause this fulness, there will then be *hardness* of the part, as well as fulness, and the edge of the organ will be felt through the parietes. The cause will then be unequivocal.

The observations which I have made on tenderness at the pit of the stomach will equally apply to what Dr. Philip has advanced respecting a peculiar *hardness of the pulse,* as indicating a change in the nature of the disease from irritation to inflammation. The longer a practitioner lives, and the more he sees of disease, the more he will be convinced that the pulse is a "res fallacissima" in indigestion as well as in other complaints. On this subject, I must take the liberty of saying, that Dr. Philip appears to have refined to an excessive degree of minuteness. If a physician's whole sense was concentrated in the point of his fore-finger, he would hardly be able to follow Dr. Philip in his diagnostic of hardness in a dyspeptic pulse. This hardness is often to be recognized only by "a particular way" of feeling the pulse. "If the pressure be gradually lessened till it *comes to nothing*, it often happens that a *distinct hardness* of the pulse is felt before the pulse wholly vanishes under the finger, when no hardness can be felt in the usual way of feeling it."† I appeal to the

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* Dr. Philip, in his Appendix, makes this fulness to depend on *debility* of the duodenum, the effect of irritability. When the mucous membrane of other portions of the bowels, however, is inflamed or irritable, we do not find that they will thus bear accumulations in contact with them. I am, therefore, still of opinion, that this epigastric fulness is more frequently caused by flatus than by inflammation and accumulation in the duodenum.

† In Dr. Philip's Appendix, lately published, and which is, in fact, a laboured answer to these strictures, the *hardness* of the pulse is changed to *tightness* of the same. The two terms certainly convey different meanings; but my objections apply equally to both.

experience of every practitioner, whether such a refinement as the above can be entitled to much confidence in the examination of a phenomenon like the pulse, which varies with almost every emotion or thought that crosses the mind of a dyspeptic invalid. Is it to be assented to, that, by such a criterion as this, we shall be enabled to distinguish irritation from inflammation; or functional from organic disease? The fact is, that in irritation of the stomach or bowels, the pulse is often as hard and as quick as in inflammation of those parts. The heart is so much under the influence of the stomach, in functional derangement of the latter organ, that no dependence can be placed on the state of the pulse, whether as regards hardness, frequency, or irregularity. In general, however, it will be found in dyspepsia, that the pulse is much quicker, not only while the food is digesting in the stomach, but during the whole time that chyme is passing along the intestines, than after these processes are finished. The pulse, through the day, will often be up to nearly 80, and fall, by nine or ten o'clock at night, to 60. Indeed, the dyspeptic invalid is never so well as just before bed-time, when all irritation is removed from the organs of digestion; and this often leads him to take for supper such food and drink as render him miserable all the next forenoon.

In fine, I am compelled to differ from Dr. Philip respecting tenderness at the pit of the stomach and hardness (tightness) of the pulse, as characteristic signs of a particular change in indigestion, from irritation to inflammation—from functional to incipient organic disease. These symptoms are present in the earliest, as well as in the latest stages of indigestion—nor do I believe that there is any regular order or succession of phenomena in this Proteian malady, by which the above-mentioned change can be ascertained. At the same time, I have no doubt that, even in the earliest periods of indigestion, there is occasionally inflammatory action mixed up with irritation, when excesses are committed, or improper stimulants have been exhibited. But on the other hand, I am satisfied, from what I have personally experienced and seen in others, that all the symptoms of what is called the *second stage* of indigestion, including tenderness at the pit of the stomach, sharpness of the pulse, and vitiated secretions, may and do very generally depend on irritation; or, in other words, on functional disorder of the stomach and bowels. I appeal to the observations of Mr. Abernethy on this point. Dr. Philip says the change in the condition of the motions marks an important change in the disorder,—namely, a transition to the *second stage* of indigestion, characterized by inflammatory action in the stomach or bowels. If the reader will consult the third case related by Mr. Abernethy, in his book, page 57, he will see how fallacious is this doctrine of Dr. Philip. A gentleman had been ill for more than a year, and his motions were "as black as his hat." He declared he had not slept for three months. He took five grains of blue-pill, and slept that night so soundly, that he was convinced he had taken some narcotic. Be-

fore he had taken the third dose, the black motions changed to a deep orange colour—a node on his shin disappeared and he declared himself well. Now, if black or morbid motions marked an important stage in the state of the digestive organs—namely, the second stage characterized by inflammation, I ask if ten grains of blue-pill would have effected a cure? But the fact is, that in the very first, as well as in the last stages of indigestion, the motions will be often found completely unnatural, and depraved in the highest degree.

The contrary of these positions has never been proved by the scalpel; while the long lives and frequent recoveries of dyspeptics, after years of suffering, afford strong presumptive proofs that no permanent inflammation or organic disease had supervened on disordered function. This doctrine, while it is less disheartening than that of Dr. Philip, is equally prudent in point of practice. It lulls into no false security—for if there be any one maxim in the healing art which is better established than others, it is that which teaches us to remove (if removable) as well as prevent, disease of structure, by correcting disorder of function. If, in examining a case of indigestion, we cannot determine whether or not inflammation or organic change has commenced (and I have shewn the difficulty, if not the impossibility of this discrimination by the marks which have been laid down by authors), what can we do better than aim at improving the functions of the organs of digestion? Nay, we may go farther; allowing that the tenderness in the epigastrium and hardness of the pulse did offer proof that inflammation or even organic change had commenced, I should be glad to know how we are to remedy the evil, but by *withdrawing the causes of all irritation* from the organs themselves, which I shall shew is the fundamental indication in the treatment of mere functional disorder?

Febrile symptoms, as evinced by alternate heats and chills, or by evening heat and dryness of skin, some degree of thirst, dryness or redness of the tongue, defective secretions, high-coloured urine, and more than usual colour in the face, with quickness of pulse, are certainly more characteristic of inflammatory action going on in some part of the system, than tenderness of the epigastrium; and, when conjoined with this last symptom, I have no objection to proper precautions, as leeches to the epigastrium, with cool saline aperients. But whoever has attentively watched or felt the phenomena of gastric and intestinal irritation, will acknowledge that even these—nay, a very strong paroxysm of fever, may be produced by irritation alone, and where there is not a particle of inflammation present. This is every day seen in children, who will shew high fever and excitement, when irritating matters are lodged in the stomach and bowels, and who will be cured of these symptoms in a few hours by a brisk purge. This fact should be borne in mind, when the dyspeptic patient evinces febrile phenomena, and the means of removing irritation should always be employed

before we have recourse to those which are calculated for the reduction of inflammation.

The younger Andral has recently published an interesting Memoir on Chronic Gastritis, in which he labours to shew, and with some success, that a peculiar disorganization of the mucous membrane of the stomach, which he terms *ramollissement*, or softening, is often found where no other symptoms had presented themselves, during life, than those which are common to the very lightest shades of indigestion. "There may have been," says he, "no vomiting,—no loss of appetite—no pain—no thirst—no disturbance of the circulation. The patient merely complains that the digestion is more or less uneasy and imperfect—and that he loses flesh and strength." The diseased condition of the mucous membrane shews itself in three grades. In the first degree, the membrane, though softened and easily reduced to a pulp between the fingers, still preserves some degree of consistence before it is scraped off by the scalpel. In the second grade, we find only a layer of pulpy or gelatinous substance, of a white, grey, or reddish colour, which might be readily mistaken for a coat of mucus spread over the cellular membrane beneath. In the third degree, this semi-fluid pulp has disappeared, and the subjacent cellular tissue is left naked, in spaces of greater or lesser extent.

M. Andral labours to prove that this softening is the legitimate product of chronic inflammation; but in this he is not quite satisfactory. He has, however, unequivocally proved that the above state of the mucous membrane takes place under the influence of irritating substances long applied to the stomach—in short, that it is intimately connected with a state of *irritation*, if not actual inflammation. It is aggravated by the imprudent exhibition of stimulants and irritants—and it is soothed, or even cured, by an opposite system. M. Andral has described other morbid appearances in the stomachs of dyspeptics, as discolourations, morbid thickenings of the coats of the organ, &c., which shew that indigestion, though seldom fatal, may, if improperly treated by tonics and stimulants, end in disorganization of the coats of the stomach.

Speaking of the nerves of the stomach, M. Andral remarks:—"Neither can we doubt that, among the various disturbances of function which the stomach undergoes, there are many which imitate, more or less completely, acute and chronic gastritis, but which are in reality, owing to a morbid state of the gastric nerves or the centres of the ganglionic system. Hence, in some individuals, we have disordered digestion; in others, vomiting; and in others still, epigastric tenderness and pain," &c.—In this I entirely agree with M. Andral.

Sect. VI.—Sympathetic Affections of various Organs.

We are now to notice the more prominent sympathetic affections which depend on this combination of gastric, hepatic, and intestinal disorder. It is difficult to say which is the organ or part that is most intimately linked in sympathy with the stomach and liver. I should say, however, that the brain, as the common sensory, to which all sensations are ultimately referred, is the first to sympathise with disorder of the abdominal organs. Pain in some part of the head is a very common symptom in this class of disorders; but the *functions* of the brain are affected in a great variety of ways—especially its *intellectual* functions. Confusion of thought, unsteadiness of the mind, irritability of the temper, defect of the memory, fickleness of disposition, and many other phenomena which are little suspected of corporeal origin, shew themselves infinitely more often than pain, deafness, vertigo, defect of vision, or affections of mere sensation. The former gradually rise into gusts of passion, fits of despondency, brooding melancholy, permanent irascibility, and still higher grades of intellectual disturbance, till, as sometimes happens, the point of temporary alienation is reached, and suicide terminates the scene. Those functional disturbances of the brain, however, which are evinced in the form of mental phenomena, are very common in *morbid sensibility* of the gastric and intestinal nerves, where the usual symptoms of indigestion and hepatic derangement are almost entirely wanting, and these will be more distinctly alluded to hereafter. In unequivocal disorder of the digestive organs, the affections of sensation about the head most engage the patient's attention. Pains of various kinds, not seldom remittent or intermittent, are felt in different parts of the scalp, about the face, or deep in the head. When purely sympathetic of stomach disorder, they are more frequently in some particular part, than in the head generally, and assimilate in their nature to tic douloureux. Indeed, I have no doubt that this dreadful disease is, in many cases, caused by irritation of the visceral nerves—and the cures which have been performed by alterative and aperient medicines, and especially by the carbonate of iron (which removes the morbid sensibility of the nerves), confirm this opinion.

In conformity with these views, it is fairly to be presumed, that many cases of epilepsy and chorea are to be referred to morbid sensibility and irritation of the gastric and intestinal nerves—else how should purgation and lunar caustic cure these complaints? The former removes the sources of irritation, and the latter the morbid nervous sensibility. But more of this anon.

If sympathetic disorder of the brain or its membranes be long continued, it is believed, and it cannot be positively denied, that inflammation first,

and change of structure afterwards, will be the result. When these processes are once set up, they become, of course, in a great measure, independent of the original cause that produces the sympathetic disorder, whether of function or sensation; and they are then not to be distinguished from primary diseases of the same parts. Nor would the discrimination, if practicable, be of any use, as respects the treatment. In what proportion of cases these sympathetic affections of the head change into inflammatory and organic disease, it is impossible to say, since few cases indeed have been so accurately watched through all their stages, as to afford any satisfactory proof, if the thing is at all susceptible of proof, which I very much doubt. As far as my own observation extends, this conversion into organic disease is not so frequent as is imagined. Head-aches of great intensity, and even epilepsy, go on for years, and often leave no traces of their existence, when death happens from other diseases. On the other hand, we see organic changes of immense extent take place in the brain, with but little pain, or disturbance of the intellectual functions even till the last. These facts should teach us caution in pronouncing on such a difficult subject, and inspire distrust of all theories or preconceived opinions.

None of the senses are more frequently affected sympathetically than those of hearing and sight. Noise in the ears, and partial deafness are very common where the function of digestion is disordered, and may often lead us to suspect the latter, when very few of the common symptoms of indigestion are present. It is not uncommon for deafness, noise in the ears, and sense of confusion in the head to disappear, for a time, after tea, coffee, dinner, or a glass or two of wine, or other stimulant, again to return when the stomach is empty. When this is the case, we may be assured that the cause is in the stomach, and that the affections of the head and organ of hearing are purely symtomatic. When these symptoms are aggravated by eating or drinking, there is then some reason to dread that a more permanent state of disorder, if not actual disease, is establishing itself in the head, and remedies should be directed to that quarter without delay. The same observations apply to affections of the organ of vision, as muscæ volitantes, indistinctness of sight, uneasiness in the eyes when reading, or when exposed to a glaring light. These phenomena should not be treated too lightly. They may be precursors, or rather indications of a complaint more formidable than that in the stomach from whence they originally sprung. Or they may be original affections of the head, and erroneously attributed to the stomach or digestive organs.

As sympathetic affections of the nervous system, we may fairly include those rambling or fixed pains in various parts of the body, which often pass for rheumatism, but which are frequently removed by re-establishing the functions of the stomach and liver. Even cases of partial paralysis, especially in children, are not seldom dependent most unequivocally on irritation in the digestive organs.

Of late years there has been such a tendency to periodical diseases generally, and especially to periodical pains about the head, face, neck, and other parts of the body, that we must not treat them entirely as stomach-affections. I have seen so many instances, during the last few years, of painful complaints about the head, resulting from malaria or some local cause of ill health, as damp grounds, the vicinity of ponds, dense woods, &c. that it is probable we are occasionally deceived in such cases, by attributing them to disorders of the stomach, when the cause is some deleterious agent emanating from the earth, and floating in the air. The periodicity of the attacks, their aggravation by blood-letting and depletion generally—and their mitigation by tonics and generous diet, will help to distinguish them from complaints purely sympathetic of stomach disorder. It is difficult to say, in some cases, whether those temporary paralyses of the portio dura of the seventh pair of nerves, by which the face is so much disfigured during speaking or laughing—by which the eyelid is caused to droop—and in consequence of which the eye cannot be completely closed, are dependant on gastric irritation or malaria. The proximate cause may be some local pressure on the nerve itself, in the neighbourhood of the ear; but I suspect that there is often a loss of function in the nerve, independent of any mechanical pressure, or organic change in its structure. There is one consolation that these local paralyses almost always get well by time and attention to diet. In some cases, however, they are very tedious. In one instance, the face continued distorted for nearly two years. Some attention is necessary to closing the eye at night, lest inflammation be set up, and opacity of the cornea ensue.

Next to the brain, I would say that the heart sympathises most readily with disorder of the liver and digestive apparatus. The irregularity and violence of action in the heart, consequent on disorder of the liver and stomach, are much more common than is generally suspected, being often passed unnoticed by either patient or practitioner. The intermissions of the pulse, and the sense of tumult in the region of the heart are sometimes very alarming to the hypochondriac or dyspeptic invalid, and also to the young practitioner; but they are really of little importance.* That diseased structure of the heart does occasionally result from long-continued disturbance of its function, occasioned by bilio-gastric affection, I believe is the case; but the instances are so comparatively rare, that this very cir-

* In a few instances, I have seen most of those symptoms which appertain to real angina pectoris, produced by disordered function of the stomach, and give way to a radical change of regimen and diet. But, in general, it is in the form of palpitation, and intermissions of the pulse, that the sympathetic disorder of the heart shews itself, and it is then not very distressing, unless the patient's mind be alarmed by the irregularity of the heart's action. In most cases of disordered digestion there is an irritability of the heart, which causes it to be excited into quick action by very trifling agitations of mind or exertions of body.

cumstance affords ground for the belief that the same may be said of other sympathetic affections. I am acquainted, at this time, with several cases where the action of the heart has been greatly disturbed for years, by dyspepsia, and yet, when attention is paid to diet and the state of the bowels, the action of the organ of circulation becomes perfectly regular. Disease of the liver, however, is much more apt to seriously endanger the heart than mere dyspepsia. In proportion, therefore, as the hepatic affection predominates over the gastric, so will be the risk of sympathetic disorder of the heart changing into disease of its structure. In all dyspeptic cases, the practitioner should bear this in mind, and be guided in his prognosis accordingly. But he should also not fail to examine the heart by means of auscultation, which will afford him the most certain means of distinguishing between functional and structural disease of this organ. This is the more necessary, because it is a certain fact, that organic disease of the heart very generally produces, or at least is accompanied by, dyspepsia; and especially by the most indomitable and distressing flatulence and distention of the stomach and bowels, which attract the patient's attention far more than the dangerous disease of the heart, of which it is only a symptom. It is difficult to account for this production of dyspepsia by disease of the heart, except on the physiological principle of sympathy. The influence of the stomach on the function of the heart is a well-known phenomenon; and if all sympathies are reciprocal, which I believe they are, the re-action of the heart on the stomach may be thus explained. Several melancholy instances of dyspepsia masking fatal disease of the heart have come under my observation. In these cases, the latter disease was quite unsuspected till all hope of checking it was at an end. I cannot, therefore, too strongly recommend the practitioner to examine minutely into the functions of *all* the great vital organs when any *one* appears to labour. By this attention we may often find out which is the primary, and which the secondary affection.

Of the sympathetic affection of the lungs ending occasionally in phthisis, I have taken particular notice at pages 532-36. I think Dr. Paris has been thrown off his guard in treating what is called "DYSPEPTIC PHTHISIS" as a creature of the imagination. Nothing is more common than a cough from irritation of the stomach—and it is surely unsafe to aver, that long-continued disorder of function can never end in disorganization of structure. But, however this may be, it is no longer a matter of doubt that chronic inflammation and other organic disease of the liver does very frequently affect the contiguous lung, which becomes consolidated, and, if there be any tubercular disposition in the respiratory apparatus, consumption is sooner or later developed. This is more particularly the case on the return of an invalid from a hot to a cold climate with liver-complaint. But on this subject I have already spoken sufficiently.

Of the sympathies between the digestive apparatus and various other

parts of the body, as the kidneys, bladder, urethra, rectum, organs of sense, skin, &c. it would be difficult to give a description. The urinary secretion is particularly under the influence of biliary and gastric disorder; and, I believe, nine-tenths of those who are affected with gravel and calculous complaints would get cured (unless the stone was of some size) by a particular regimen, which will be presently described. It is a natural supposition that, in faulty states of the digestive organs, improper matters are taken into the circulation, and are afterwards thrown off by the kidneys—hence the turbid, oily, sedimentous, and strong-odoured urine of dyspeptic and bilious people.

The sympathies established between the cutaneous nerves and those of the digestive organs are very numerous, and tend to puzzle the practitioner exceedingly. The shoulders, the back, the limbs, the face, and especially the *back of the head and neck*, are all very subject to painful and indescribable sensations, from irritation in the first passages; and the mere nervous connexions do not afford satisfactory explanation of these phenomena, since the sympathetic association is generally strongest where the nervous communications are least numerous. Whenever these unaccountable feelings are complained of, they should lead us to suspect irritation of the stomach or liver—and this irritation will often be found to exist, and to be the cause of the phenomena, when there are very few of the common symptoms of indigestion or of derangement of the biliary secretion present.

The sympathy between the nerves of the digestive organs and the general nervous system, has been always recognized and acknowledged —and by none more accurately than by Dr. Whytt, nearly one hundred years ago.

" A delicate state," says this acute observer, " of the first passages, or an *unnatural sensibility of their nerves*, not only disposes people to many complaints in those parts, but the *whole nervous system* is thereby rendered more moveable, and liable to be affected by the slightest causes." " When my stomach and bowels have been out of order, and affected with any uneasy sensation from wind, I have not only been sensible of a general debility and flatness of spirits, but the unexpected opening of a door, or any such trifling unforeseen accident, has instantly occasioned an odd sensation about my heart, extending itself from thence to my head and arms, and, in a lesser degree, to the inferior parts of my body. At other times, when my stomach is in a firmer state, I have no such feelings, or at least in a very small degree, from causes that might be thought more apt to produce them. From what has been said we may see that faintings, tremors, palpitations of the heart, convulsive motions, and great fearfulness, may be often owing more to the infirm state of the first passages, than to any fault either in the brain or heart. The powers which the alimentary canal, *when its nerves are disagreeably affected*, must have in

producing disorders in the most distant parts of the body, cannot be doubted by those who attend to that wonderful and widely extended sympathy which obtains between it and almost the whole system."—WHYTT.

The experience of one hundred years has not contradicted one iota of the above observations, though the varying doctrines of the day have often caused them to be lost sight of for a time.

When the general nervous system has once participated in the morbid sensibility of the gastric and intestinal nerves, there is no end to the variety of phenomena produced in different individuals, by the slightest causes. Changes of weather, errors in diet, mental emotions, or any the most trifling impression, will then give rise to a train of morbid feelings and symptoms which it would be impossible to describe or name. People in health cannot conceive that these feelings can be real, and therefore little sympathy is shewn towards the unhappy victim of morbid sensibility, whose ailments are nevertheless as really *physical* as those labouring under fever, or any other disease, though fortunately they are not so dangerous.

ON

MORBID SENSIBILITY

OF THE

STOMACH AND BOWELS,

WITHOUT ANY OBVIOUS OR WELL MARKED SYMPTOM OF DISORDER IN THOSE ORGANS THEMSELVES.

I HAVE, in several parts of this Essay, observed, that the sensibility of the internal surfaces of the stomach and bowels, or, in other words, of the ganglionic nerves, is not the common sensibility of the skin, since they are insensible to the touch or to the application of common substances; although they are endowed with a most acute sensibility of their own, which is termed their organic sensibility. This peculiar sensibility may be excited to such a degree as to occasion convulsions, tetanus, and even death, without our being conscious of any sensation in those parts themselves. Thus a small worm, an ascaris, will so offend the organic sensibility of the intestinal nerves as to cause epileptic fits, or general convulsions. A hundred medicinal substances will affect the whole frame, in a hundred different ways, when applied to these surfaces, and all without any consciousness, on our part, of irritation there. In short, in very many instances, we can only become acquainted with the operation of medicines, articles of diet, or other agents, on these surfaces, by observing their effects elsewhere—not by the sensations they produce in the parts themselves. Tartar-emetic is a familiar instance. The heart, the brain, the nerves, the muscles, the glands, the mind itself—will all be powerfully affected by the application of a few grains of this medicine to the stomach, while not the slightest sensation is felt in the organ to which it is first applied. If, indeed, we apply to this organ substances of so acrid or pungent a nature as to produce pain or other unpleasant sensation there, we change the organic into common sensibility, or we exalt the low degree of the latter, and thus offer dangerous violence to the parts; but all impressions below this range are made without our knowledge. And it is very curious, as before observed, that when this conscious pain or other sensation is excited in the stomach or bowels, there is less effect, in general, produced on the other parts of the machine. Can we wonder, after this, that the great majority of those effects which we feel in different parts of the body, from sympathy with the stomach and bowels, are unattended with any *sensible* operation or excitation in those organs themselves? This opens out an immense field for observation—and it is only by sedulous observa-

tion that we can cultivate that field with advantage. We know that the stomach and bowels are influenced by a great variety of agents, physical and moral;—and we know, by experience, that their effects on these organs themselves are of comparatively trifling consequence, when compared with the effects reflected back from these organs on every other organ and function of body and mind.

We are now prepared to take a concise view of the causes which induce that MORBID SENSIBILITY of the stomach and bowels, from which spring so many disturbances of function in other parts of the living machine. These causes may be divided into two classes—physical and moral. Numerous and powerful as are those of the physical class, the moral causes are still more predominant and influential.

Sect. VII.—Physical Causes.

Every substance, medicinal or dietetic, which is applied to the stomach, induces a physiological action in the nerves, blood-vessels, and fibrous structure of that organ, which we call *excitement*—and the aptitude or capacity of the stomach for the production of this action, we call its *excitability*. If the substance applied be of healthy quality and in proper quantity, it produces *insensible or salutary excitement*: that is, an action of which we are unconscious. The substance may then be termed merely an *excitant*, as a moderate quantity of plain food and drink. But, let the substances introduced into the stomach be of improper quality, or in improper quantity (as ardent spirits or acrid medicines), and the action produced thereby will be raised from *insensible* to *sensible* excitement—that is, we will be conscious of something going on in the stomach. Here the agent introduced no longer deserves the name of healthy *excitant*, but becomes, in fact, an *irritant*—and the action induced is *irritation*, rather than excitement. If these irritants continue to be applied, and this irritation to be induced, the aptitude of the stomach, which we have termed its *excitability*, is changed into *irritability*, or MORBID SENSIBILITY, as shewn by pain and disordered function in the organ itself (indigestion, &c.), or what is much more frequently the case, by a variety of sympathetic disorders and morbid sensations in distant parts of the body, as well as in the mind, or rather its organ, the brain.*

* It is impossible, in discussing these subjects, to avoid occasional tautology; but I had much rather be guilty of repetitions than fail in impressing on the mind of the young practitioner clear ideas respecting these very important but abstruse points of pathology.

It is not very material whether the *sensible excitement* induced in the stomach by food or drink be of a pleasurable or painful kind. The final result will be the same—irritability, or morbid sensibility. If the excitement be pleasurable, as from wine, we are *spoiling* the stomach, as we *spoil* a child, by indulgence; we are *educating* the organ improperly, and laying the foundation for morbid irritability.* On the other hand, if what we take into the stomach induce disagreeable sensations there, we are then offering a violence to the organ which will very soon terminate in disease; or, more properly speaking, the natural excitability of the stomach is already changed into morbid sensibility, and disorder has actually commenced. But let us take a closer view of the physical agents or causes now under investigation.

These are very numerous, the surface of application being that of the whole body, external and internal. The stomach may be considered, hardly excepting the brain, as one of the greatest centres of sympathy. Every impression on the skin, whether of cold or of heat, of humidity or of drought, influences more or less, the functions of the stomach. This must have been experienced by every individual. In a climate like ours, therefore, where atmospheric changes are so perpetually occurring, not only as to temperature, but as to humidity, density, rarity, &c. we cannot wonder that the functions of the alimentary canal should be so frequently disturbed.

On those who live in the pure and open air of the country, these atmospheric changes have comparatively little effect; but in cities and large towns, where the whole constitution is effeminated—where the external surface of the body is not habituated to the vicissitudes of the skies—where moral causes, are constantly operating injuriously on the digestive organs—and where air, imbued with millions of miasmata, exhaled from every thing in the animal, vegetable, and mineral kingdoms, is breathed, swallowed, and kept in contact with the skin, the effects are conspicuous in the sallow complexions, puny or capricious appetites, and imperfect digestion of the inhabitants.

This state of the appetite and digestion, resulting from sedentary habits, impure air, late hours, and mental perturbations, leads to an aggravation of the evil, by the recourse which is had to high-seasoned dishes and stimulating drink, indulged in, more or less, by all classes of society. The nerves of the stomach are daily irritated by what is ingested—while the nerves of the bowels are irritated by what is undigested. To these may be added the vitiated secretions themselves, not only of the stomach, but of the liver, pancreas, and all the innumerable glands that stud the surface of the alimentary canal. These causes produce all the

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* On this point I differ from Mr. Abernethy, who seems to think that pleasurable excitement in the stomach is salutary.—*See the section on Mr. A.'s system farther on.*

phenomena of indigestion detailed in the preceding section, not only as regards the disorder in the organs of digestion themselves, but as respects the innumerable affections of distant parts, from sympathy with the stomach and other internal viscera.

The qualities and quantities of food and drink, which produce or keep up irritation and morbid sensibility in the digestive organs, are but little suspected of mischief, because they are in general use, and because many individuals are daily seen to take far greater liberties with the luxuries of the table, without any very apparent bad effects resulting. The evil day, however, arrives at last, and it is found that the same food and drink which had been so long taken with impunity, now begin to be followed by uncomfortable sensations, and, at length, with actual disorder in the digestive apparatus. Still this is considered as an accidental occurrence, not connected with previous habits of diet, but owing to other and unknown causes. This last is very often true, in part. The previous habits may only have produced a predisposition to indigestion; and, then, when any other cause is applied, especially of a moral nature, the explosion takes place. The fact appears to be, that in civilized life, the host of moral and physical causes of disease, that are always in operation, keep the powers of the digestive organs below the standard of health; while the quantity and quality of our usual food and drink are calculated to impair these same organs, even if they were in a state of the most perfect integrity of function. If this position be true, and I believe it to be so, it is easy to see the reason why so many labour under indigestion, even in its obvious or open forms. Among the leading *physical* causes of indigestion, then, I place our daily food and drink. I have shewn that neither the one nor the other *ought*, in health, to produce any sensation in the stomach, if taken in the proper quantity, and of the proper quality. But, whenever our drink induces much sensible excitement in the system, or our food is followed by much inaptitude for mental or corporeal exertion, we have transgressed the rules of temperance, in some degree, and are laying the foundation for disorder. When food produces any sensation of *discomfort* in the stomach, as sense of distention, &c. attended or not with some degree of depression of spirits or irritability of temper, indigestion (or rather morbid sensibility) has actually commenced, however slightly,—and the height to which it may be carried, if the irritation of too much food or too much drink be continued, I need not now describe.

As of all the *physical* causes of indigestion, our diet is the chief—so over this cause we fortunately have the greatest control. But sensuality and conviviality are perpetually seducing us from the paths of temperance, and seldom permit us to think of preserving health till we have lost it. It is needless to describe the qualities and the quantities of food and drink that are injurious. I have endeavoured to lay down the rule by which each individual is to judge of this matter:—*any discomfort of body, any irrita-*

bility or despondency of mind, succeeding food and drink, at the distance of an hour, or even a day, may be regarded (other evident causes being absent) as presumptive proof that the quantity has been too much, or the quality injurious.

It is, however, far more frequently by the *quantity* of our food that the stomach is irritated and its nerves rendered morbidly sensible, than by the *quality*. In respect to this last, the vegetable world (however lauded by hermits and philosophers) is infinitely more prolific of irritation than the animal kingdom. Farinaceous food, however, (as gruel, sago, arrow-root, for example), is an exception. Perhaps, of all species of food, this is the least irritating, and where a high degree of morbid sensibility prevails, it is often the only thing that can be borne.* Tender animal food is next, in point of unirritating qualities, with the advantage of being more nutritious and less bulky. We see whole nations, as the Hindoos, Irish, and Scotch, live and thrive on food almost exclusively farinaceous ; while others, as in some parts of South America, live well upon animal food, and that almost alone.

In respect to drink, water is the only fluid which does not possess irritating, or, at least, stimulating qualities—and in proportion as we rise on the scale of potation, from table-beer to ardent spirits, in the same ratio, we *educate* the stomach and bowels for that state of unnatural sensibility, which, in civilized life, will sooner or later supervene. Moderation in wine or dilute spirit and water would, however, seldom be productive of mischief, if they were not accompanied by other causes, moral or physical. There is infinitely more mischief done by too much food than by too much drink.†

The *physical* causes, then, of morbid sensibility of the nerves of the digestive organs are—atmospheric impressions on the external surface of the body—cutaneous disorders and their sudden retropulsion—disordered functions and diseased structure in other parts of the body, as in the brain, liver, &c. acting through the medium of sympathy on the organs of digestion—food and drink in too large a *quantity*, or of too stimulating or

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* I have been greatly misunderstood, as recommending people, even when but a little out of health, to live upon water gruel, and drink nothing but water. But it should be recollected, that this regimen is only prescribed for the highest grade of irritability and debility of the digestive organs, and not for people in health, or who can digest more substantial aliments without difficulty. There are, indeed, a considerable number who cannot so well digest these farinaceous slops as a small quantity of animal food. These people should always be guided by their own feelings in the selection of food.

† People who are much in the open air—who take active exercise—whose minds and bodies are well employed, may take with impunity both food and drink which the effeminate and sedentary would severely suffer from. This will be more clearly shewn in the section on Travelling Exercise farther on.

indigestible a *quality*—acrid substances, as drastic purgatives, &c. taken into the stomach, or generated in the alimentary apparatus—sedentary habits. Under these heads all, or almost all, the *physical* causes may be ranged. They are very numerous, and act through two principal channels—sympathy and direct application.

If it be asked how food, which is the natural stimulus of the nerves of the stomach and bowels, should render them morbidly sensible? I might answer, by asking another question—how does light, which is the natural stimulus of the optic nerve, render it morbidly sensible, if too brilliant and too long applied? The parallel, I think, is perfectly just.

The same reasoning is applicable to drink. If, for water, we substitute ale, wine, or spirits, in too great quantities, we stimulate the nerves of the stomach; though some stomachs will bear this stimulation for many years in succession, with little apparent injury. But not so in civilized, and especially in *civic* life. By this stimulus the nerves are excited, and, in due time, irritated, so as to set up an habitual state of *morbid sensibility*. The doctrine of Brown, indeed, teaches us that this constant stimulation will ultimately wear out the excitability of the nerves, and render them *less sensible* than at first to the same stimuli. It may be so; but I much doubt whether, in the last sad years of the confirmed drunkard, the *morbid sensibility* of the stomach and bowels is not still his unhappy lot. His appetite and powers of digestion are nearly extinguished, I grant; but the stomach becomes *more* irritable, in proportion as intemperance has been long-continued; till, at length, the presence of food cannot be borne without pain or sickness, and a very small quantity of that burning potation which he used to swallow so freely, now makes him quickly inebriated. These are facts which we see every day, and they strongly support the position I have laid down.

Sect. VIII.—Moral Causes.

There is but one path along which these causes can travel from the organ of thought to the organs of digestion; but the number of airy agents, and the velocity with which they glide along the silvery pneumo-gastric conductors, baffle all calculation! The intellectual operations of man, in a state of high civilization, as compared with man in a state of nature, are as much more numerous as the mechanical arts of Europe out-number the simple contrivances of Otaheite. In such proportion, also, his susceptibility to moral impressions is augmented to an inconceivable extent; and these impressions, though first received by the sensorium, are all reflected

on the organs of digestion with more or less force, according to the state of predisposition in these organs. In this country, where man's relations with the world around him are multiplied beyond all example in any other country, in consequence of the intensity of interest attached to politics, religion, commerce, literature and the arts—where the temporal concerns of an immense proportion of the population are in a state of perpetual vacillation; where spiritual affairs excite great anxiety in the minds of many; and, where speculative risks are daily run by all classes, from the disposers of empires in Leadenhall Street, down to the potatoe-merchant of Covent Garden, it is really astonishing to observe the deleterious influence of these mental perturbations on the functions of the digestive organs and nervous system generally. The operation of *physical* causes, numerous as these are, dwindles into complete insignificance, when compared with that of anxiety or tribulation of mind. These causes very often escape the investigation of the physician, unless he is very much on his guard. The patient is prodigal of description, as far as regards his corporeal feelings—and he is often very candid as to the *physical* causes which may be enquired after by the practitioner; but he seldom reveals (for obvious reasons) the real origin of the evil, when it is of a moral nature, unless it be accidentally drawn from him by cross-questioning. The disorder of the digestive apparatus, however, induced through mental emotions, is very generally of a different cast from that resulting from physical causes, such as intemperance, &c. but the slightest physical causes, in addition, exasperate the complaint exceedingly.

It is hardly worth while to attempt any physiological explanation of the mode in which the mental discomfort effects the corporeal disorder. The fact has not escaped the notice of even the most heedless observers, and is pointedly alluded to by poets, as well as physicians. A single look, and a very few words from the tyrant monarch, gave the ambitious Wolsey a fit of indigestion which terminated the Cardinal's life! The function of digestion, as, indeed, every function, is so completely under the nervous influence, that there can be no doubt of the channel through which the mischief is produced. Mental anxiety not only arrests or disturbs the digestive process in the stomach, by interrupting or weakening the nervous influence on which it depends, and thereby leaving the materials of food open to the chemical laws that would act on them out of the body; but, in a remarkable manner, vitiates or impairs the biliary secretion, thereby adding a new and powerful source of irritation to the delicate nerves of the duodenum and small intestines. The consequence is, that the whole line of the alimentary canal, from the cardiac orifice to the valve of the colon, is kept in a state of *irritation* from the time the food is taken in till its remains pass into the great intestines. This is distinctly felt by the individual, who has no ease, either in mind or body, till the process of digestion, such as it is, and of chylification is over, when he feels comparative comfort. The mind

and body then seem relieved from a burthen, and a most significant remark is often made by people in this condition, that, "*if they could live without food they would be well.*" Whenever this observation is made, we may rest assured that there is a morbid sensibility established in the nerves of the alimentary canal—and it is two to one that this has been induced by mental anxiety, or, in other words, by moral causes. But, in a great proportion of cases, the *effects* of this morbid sensibility of the stomach and bowels are not distinctly cognizable to the individuals by pain or uneasiness in the parts themselves, nor by any very morbid state of the evacuations; but in the re-action of the gastric and intestinal irritation on the brain, as evinced through the mental faculties. They notice, therefore, the exasperation of these mental miseries, at certain times, but do not suspect the food and drink as the cause of these exasperations. Hence arises a whole class of maladies, which, being unattended by any evident disorder of the body, are attributed to the imagination, and the unhappy individual is put down by his friends, and too often by his physician, as a decided HYPOCHONDRIAC.

SECT. IX.—NERVOUS IRRITABILITY, MENTAL DESPONDENCY.

OF the intimate nature of *mind* I profess to know nothing. The study of that department belongs to the metaphysician, who, as his name imports, goes *beyond* the physician. It is very evident that man is a compound being—moral and physical, or mental and corporeal. And as mind can only be manifested, in this world, through the instrumentality of matter, so its faculties or dispositions are pretty regularly influenced by the state or condition of our corporeal organs. Some of our mental faculties, however, are much more under the influence of physical disorder than others; but I much doubt whether any, even the very highest attributes of the mind, can stand completely independent of, and unaffected by, derangement of function or structure in some parts of the corporeal fabric. A very slight inflammation of the membranes of the brain, will destroy, or pervert, for a time, the judgment, the memory, the feelings, the affections, of the greatest philosopher or divine. How, then, can we wonder that various derangements of the body, and especially of those organs with which the brain is closely linked in sympathy, should disturb the subordinate attributes of mind, and especially the TEMPER of an individual.* The temper

* When I say that the manifestations of the faculties of the mind are dependent on, and influenced by, the state of our corporeal organs, I offer no support to the doctrines

is liable to be assailed at once by two different classes of irritation—moral and physical; and the aids of religion and philosophy are much less available, and much less effectual, in the latter, or physical class of ailments, than in the former. It is curious, that one of our ablest poets has embodied, in a well-known couplet, these two classes of irritation, by which the TEMPER of man is so greatly modified:

> "See the same man in *vigour*, in the *gout*,
> Alone, in company—*in* place, and *out*."

The physical cause is shewn in the first line—the moral cause in the second.

But it is not by *painful* diseases that the temper is most strongly influenced. Many an individual who would bear, with fortitude and comparative equanimity, a fit of the gout, or the pain of a surgical operation, will be completely changed in his temper, and become waspish, irascible, and captious, by an irritation in the stomach (transmitted sympathetically to the brain) of which he is perfectly unconscious. It is said, and I believe with justice, that an infant never cries without feeling some pain. The same observation may be extended to maturer years; and it might be safely asserted that the temper is never unusually irritable without some moral or physical cause—and much more frequently a physical cause than is suspected. A man's temper may undoubtedly be soured by a train of moral circumstances, but I believe that it is much more frequently rendered irritable by the *effects* of those moral causes on his corporeal organs and functions. The moral cause makes its first impression on the brain, the organ of the mind. The organs of digestion are then disturbed sympathetically, and re-act on the brain. And thus the reciprocal action and

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of the Materialists. The muscles are the organs of motion, but they are not the faculty which *causes* the motion. The eye is the material organ of sight, but it is not the faculty of vision. *Sight* is not seated in the coats or humours of the eye—in the retina—the optic nerve—nor, in fact, in any portion of the brain. All these parts are constructed so as to convey the images of things to the *mind*—but none of these parts can see—not even the ultimate particle of brain in which the optic nerve terminates. They are all *instruments* of vision, and the faculty or sense itself is beyond the boundaries of matter. The same may be said of hearing, and of every other sense. Dr. Haslam, and some other of our modern philosophers, have uttered great absurdities, when they said that the "brain may think." The brain can no more think, than the globe of the eye, the optic nerve, or the thalamus nervi optici can see. The brain is merely that portion of matter which is in most proximate communication with the mind or immaterial principle. It is, therefore, only an *instrument* through which the mind receives impressions from without, and transmits its dictates from within. But in all intellectual operations, the material organ is as necessary to the mind, as the mind is to the material organ. When the instrument is disordered, the manifestation of the mind is deranged. From this explanation it will be remembered that, when I speak of disorders of the *mind*, I merely mean the material organ of the mind.

re-action of the two systems of organs on each other, produce a host of effects, moral as well as physical, by which the temper is changed and the health impaired.

But, in connecting irritability of temper with a physical disorder, I by no means wish to furnish the person thus afflicted, with an excuse for giving way to every impulse of irritation. On the contrary, the moral or rational curb which he should now endeavour to keep on his temper, ought to be more forcibly strained than ever. As the *original* cause of the irritability is generally of a moral nature, so the means of cure must partake of a moral kind. Irritability, like every other disposition, will be certainly increased by indulgence. It is, therefore, of the utmost importance, not only to avoid every source of moral irritation, but to check the first movements of irritability, as one of the chief remedies for the disorder. The physical means of lessening this irritability of temper will be pointed out hereafter, while treating of the irritability of the stomach, by which it is so much increased, even when it is not originally produced thereby.

MENTAL DESPONDENCY is so nearly allied to HYPOCHONDRIASIS as to be, in fact, a lower grade of this last distressing disorder. At a first glance, irritability and despondency would seem to have little analogy to each other: yet they are not only of a kindred nature, but the latter (mental despondency) appears to be the connecting link between mere irritability of temper, and that high and distressing degree of nervous affection, MELANCHOLY. I have never yet seen a single instance of mental despondency where, on accurate investigation, it could not be traced to some connexion with bodily disorder—and, in nine cases out of ten, to deranged function of the digestive organs—or to morbid sensibility of the stomach and bowels. It is quite in vain to attempt to rally people into good spirits by mere argument, when the cause is of a physical nature, which it generally is. The mental despondency resulting from a moral cause, as a domestic affliction, a pecuniary loss, disappointed ambition, or crosses in love, is of a different character from that which is the consequence of corporeal disorder. It very generally, however, induces this corporeal disorder, and then the malady is necessarily increased, and its symptoms complicated, partaking of a moral and physical nature. It is in such circumstances that judicious medical advice may be of considerable importance.

SECT. X.—HYPOCHONDRIASIS.

THIS curse of civilization is not confined to any age or any nation. Wherever the mind has been cultivated at the expense of the body, there

hypochondriacism has prevailed. Aristotle informs us that all the great men of his time were hypochondriacs, or at least melancholics; and the disease, in its more marked forms, has been described by physicians and even by poets, from Hippocrates down to the present time.

In respect to the nature of this disease, I am convinced that juster notions were entertained of it some hundreds of years back than at the present moment, with all our advantages of pathological investigation. Cullen defines it to be "*indigestion*, with languor, sadness, and fear, from inadequate causes." Now, I do maintain that, although hypochondriacal symptoms often attend indigestion, as indeed I have abundantly shewn, yet, indigestion is by no means essential to hypochondriasis. In several patients whom I have attended, and who exhibited good specimens of hypochondriacism, the appetite was good, the evacuations perfectly natural, and no pain, flatulence, or other symptom of indigestion in the stomach was complained of. In most of these instances, however, the hypochondriasis could, at any time, be exasperated or mitigated by free or by abstemious living—shewing that the nerves of the stomach and bowels are concerned in the mental phenomena. The Cullenian doctrine, I believe, is the prevailing one in this country; while two different theories of the disease obtain on the Continent—especially in France. The disciples of Broussais consider hypochondriasis as depending mainly on a state of chronic inflammation of the stomach and bowels, while an able author, M. Falret, has laboured to prove that the seat of the disease is in the brain. The doctrine of Broussais is, indeed, pretty nearly the same as that of Dr. Philip—but it is surely untenable, seeing the lengthened age which hypochondriacs attain, and the frequent absence of all symptoms or proofs of this chronic inflammation. In respect to M. Falret's doctrine, I think it is evident that the affection of the brain is more often secondary than primary—though it is very reasonable to suppose that, in process of time, the brain does actually become affected, in the same way as we see long-continued disturbance of function in any other organ, end ultimately in change of structure. But these are consequences, not causes of the original malady. Thus we see hypochondriasis occasionally terminate in monomania, or aberration of judgment on a single point—and then it is possible that actual lesion of the brain or its membranes has taken place, though this is by no means always the case. None of the modern doctrines, however, are new. Hippocrates, Galen, and Areteus, attributed hypochondriasis to black bile (the hepatic doctrine of our own time)—Diocles placed the seat of the disease in the stomach—others in the liver, mesentery, and spleen. Willis considered it an affection of the brain and nervous system (the doctrine of Falret)—while Sydenham made it depend on debility, and on irregularity of the animal spirits. Boerhaave believed in the existence of a tenacious matter, obstructing the vessels of the hypochondria. Lower accused the state of the blood—and Hoffman believed that the disease

often depended on *chronic inflammation of the mucous membrane of the intestines*—the present doctrine of Broussais.

The following opinion of Villermay (taken from Whytt) precisely accords with my own observations and experience. "Ce n'est pas dans l'alteration du tissu nerveux lui-même, que reside la cause immediate de cette nevrose; c'est dans une affection *des proprietés vitales des nerfs de la nutrition;* aussi l'on reconnait généralement pour siége primitif de l'hypochondre, les viscères abdominaux, specialement l'estomac *affecté dans leur sensibilité organique.*" This appears to me the true state of the case.

I have already observed, that mental anxiety, too much exercise of the intellect, and too little exercise of the body, were the chief causes in this, and, indeed, in all other countries, of the various phenomena of hypochondriasis; and that a *morbid sensibility* of the nerves of the stomach and bowels, with or without the usual symptoms of disordered digestion, was the leading feature of the disease, and the principal cause of the varied and endless train of symptoms which develop themselves in the mind and in distant parts of the body.

Hypochondriasis is generally represented as commencing with some unequivocal affection of the stomach, as sense of uneasiness and distention after eating; slow and difficult digestion; eructations of air, acid, or portions of the food; flatulence in the bowels some hours after eating; fur on the tongue, especially in the morning, with a pasty, disagreeable taste in the mouth; occasional nausea, or even sickness of stomach; appetite either defective, irregular, or voracious; disagreeable odour on the breath; irregularity, but generally constipation of the bowels, &c.—in short, the usual symptoms of indigestion. This may be the case, especially when arising from physical causes, as intemperance and the like; for at this early period, the extensive morbid sympathies are not established—the mental phenomena are not developed—and the individual, in short, is not hypochondriacal. But let this state of the digestive organs continue for a certain period, and become aggravated—or let the causes be of a moral rather than a physical nature, as losses in business, crosses in love, disappointed ambition, or a thousand other mental afflictions—and then we shall find that the original train of corporeal disorders in the digestive organs is masked, or almost entirely disappears, under the complicated sympathetic affections of remote parts. These sympathetic affections are of a mixed character, corporeal and mental. In proportion as the *causes* are of a physical nature, so will be the predominance of the sympathies:—And, on the other hand, in proportion as they are of a moral nature, so will the sympathetic disorders be of a predominant intellectual character. In general, however, they are mixed. There may be palpitation and irregular action of the heart—cough, or other affection of the lungs—pain, heat, confusion, giddiness, noise, or twenty other sensations about the head—uneasiness or pain in the region of the kidneys, the bladder, the rectum, or other parts

of the body. In short, there is not an organ or spot of the whole human fabric which is not liable to become the seat of some morbid feeling, more tormenting than the most dangerous organic disease;—so true is the expression of Mangetus:—"*Signorum maximus est numerus, vix enim ulla pars corporis est quæ vim hujus morbi effugit, præcipue si morbus radices altè egerit.*" At the same time, we need not expect all, or even a majority of these symptoms in any one individual.*

In the more advanced, or rather in the higher grades of hypochondriasis, especially if the morbid sensibility of the nerves of the digestive apparatus has been induced by moral affections of a trying nature, then the intellectual functions—the sensations, the perceptions, the meditations, are singularly disordered. The nerves of sense, under these conditions, are morbidly susceptible to an astonishing degree. Thus, any sudden noise will make an impression as vivid as if the organ of hearing was distributed over the whole surface of the body. It is said of the hypochondriac, that he *exaggerates* every feeling:—But the truth is, that every sensation is *exaggerated*, not by his voluntary act, but by the morbid sensibility of his nerves, which he cannot by any exertion of the mind prevent. Hence his imagination is perpetually placing these morbid feelings in different parts of the body to the account of some serious organic disease. The nerves of the hypochondriac are so painfully susceptible of every impression, and the mind is so harassed by these distressing appeals from the senses, that the individual endeavours to avoid society, from the fear of collisions—or if the ties of friendship or other motive draw him into conversation, he is perpetually describing his complaints, or dwelling on their fatal tendency. Finding but little relief from medicine, and, indeed, seldom giving any medicine a fair trial, while the *consolation* of friends generally increases his miseries, as consisting of raillery, or improper attempts to persuade him that his complaints are imaginary, he flies from one medical man to another, and not unfrequently becomes the dupe or the victim of quacks, who humour his ideas—confirm him in the belief of the reality of the danger which he apprehends—or delude him by unequivocal assurances of cure. It is no wonder that, tired out with disappointed expectations, and tortured with

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* The sense of taste is sometimes remarkably vitiated in morbid sensibility of the stomach and bowels. Thus, I have known a gentleman who was annoyed with an alternate taste of copper in his mouth, and a flavour of putrid fish. When his stomach was empty, he had the coppery taste—and when it contained food, he had the putrid fishy flavour. These perversions of the gastric and gustatory nerves rendered his life completely wretched. The first edition of this essay fell into his hands. He adopted a most rigid system of diet, and derived infinite benefit from the measure. He then came and informed me of the result. Since the 4th edition of this work was published, several cases have presented themselves, where these disagreeable tastes in the mouth have produced the most distressing effects, and yet where no other ostensible symptom of stomach-disorder could be detected.—*9th Edition.*

wretched feelings, his life should become burthensome to him, and that he should look upon death as the only deliverer from complicated and incurable ills. It is not one of the least curious anomalies in this strange malady, that the individual who appears so solicitous about every symptom of his complaint—and consequently about life, should not very rarely be the one to commit suicide. The fact is, that hypochondriacism, in its highest degree, passes into monomania, or mental delusion on a single subject—and it is *despair of relief* that drives the sufferer to fly into the arms of death to escape the miseries of existence.* I shall, however, pass over those aggravated cases of hypochondriasis, approximating to aberration of intellect, in which, for instance, the patient fancies the existence of something quite impossible, in order to make a few observations on far lower, but far more frequent grades of the disorder, characterized by mental despondency, fits of passion, irritability of temper, gloomy anticipations, melancholy moods, alternate sallies of good and bad spirits, &c. which meet the eye every hour of the physician's life. In civilized society, indeed, what with ennui and dissipation in the higher ranks—anxiety of mind, arising from business, in the middle classes—and poverty, bad food, bad air, bad drink, and unhealthy occupations among the lower classes, there is scarcely an individual in this land of liberty and prosperity—in this

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* Since the 8th edition of this work was printed, one of the most remarkable cases of hypochondriacal monomania on record, has become public property by its notoriety—I allude to the melancholy case of the late Robert M'Kerrell, Esq. who terminated his life by swallowing two ounces of prussic acid, at his apartments in Regent-street, in October, 1835. This gentleman amassed a considerable fortune in India, and on his return to his native country, stood a contested election at Paisley, and lost it. From that time, he became affected with a periodical illusion respecting a particular *number*, which, every second day, seemed connected with his fate, both in this world and the next. Every time that this fatal number, or any of its combinations, presented itself to his eye, he suffered the torments of the damned—and that only on the bad day! He communicated the secret to myself, and to myself alone, two years and more before his death. I did all in my power to combat the illusion, but in vain. Tired out with his sufferings, he committed suicide in the most cool and determined manner, after writing a letter respecting his funeral, which lay open on the table beside the bottle that contained the poison. My evidence alone preserved a large fortune from being forfeited to the Crown, as I proved, from my visiting-book, that he committed the horrid act on the day of the illusion, and consequently when he was labouring under MONOMANIA. On examination after death, we found some most remarkable organic diseases, which, no doubt, were connected with the mental hallucination. Thus, we discovered a stony concretion, with sharp spikes, growing into the PAR VAGUM, or great pneumo-gastric nerve, and which must have proved a source of intense irritation; but being a nerve distributed to organs not endowed with common sensibility, no pain was felt in these parts by the patient. The stomach, the heart, and the lungs, the organs to which this nerve went, were all in a state of disease. The whole case is published, and the details are of the highest importance, not only in a medical, but in a medico-legal point of view.—*9th Edit.*

kingdom of "ships, colonies, and commerce," who does not experience more or less of the "English malady"—that is to say, a preternaturally irritable state of the nervous system, connected with, or dependent on, MORBID SENSIBILITY of the stomach and bowels.*

As it is more easy to remove disorders in the beginning than when they have taken deep root, so it is very important, both to the patient and practitioner, to detect the lighter shades of what may go on in the end to confirmed hypochondriacism, than which there is not a more terrible or more intractable malady incident to man. It is fortunate for the patient when unequivocal disorder of the stomach and digestive organs is an early feature of the disease, for then his attention is directed to the root of the evil. It is, also, a sign that *physical* causes are operating deleteriously, and these can generally be more effectually combated than moral causes. But when the disorder in the digestive organs is not very prominent, or is wholly inapparent, and the malady shews its first approaches only through the medium of the mind, or through distant sympathies in the body, the real state of the case is seldom ascertained till serious mischief is done.

Whenever, therefore, a man finds any alteration in his temper or moral feelings, there being no adequate moral cause, he should suspect some *physical* cause. Let him then narrowly watch the state of these deviations from natural temper or feelings, after free living and after abstinence—after complicated dishes, and after plain food—after wine and after water. If he does not find an increase or diminution of his mental or corporeal ailments, according as he leans to the one side or to the other of these points of regimen, then the complaint is not that which I am now describing. But I am confident that he will very generally recognise the correspondence between cause and effect—and if so, how can we have a

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* There are but few who have led an early active life, whether in the army, the navy, the colonies, or in commercial pursuits at home, who are capable of enjoying the anticipated pleasures of retirement afterwards. We, therefore, find a great proportion of these in a state of hypochondriacism, more or less prominent. Exercise, whether of body or mind, is the great antidote, when in moderation, to this state—but few will take regular exercise, mental or corporeal, without some distinct pursuit, which those who are retired have not. Besides, as it is only the wealthy who voluntarily retire, they think one great object of their remaining days is to live well; and this very indulgence leads to more misery than they ever experienced in the pursuit after riches. Thus the *physique* poisons the *morale*. Those, on the other hand, who are forced to retire from military service, in consequence of their services being no longer wanted, become discontented as well as idle—and a state of hypochondriacism very generally succeeds. Of these we see daily instances, since the conclusion of the long and disastrous war with France.

This subject is fully discussed in a small work entitled "The ECONOMY OF HEALTH; or the Stream of Human Life, from the Cradle to the Grave." By Dr. Johnson.

better test for the nature of the complaint, or a firmer basis for the treatment? Even if the original causes be purely of a moral nature—as, for instance, severe losses in business, or speculations, &c.—still the mental despondency is aggravated by the morbid sensibility of the nervous system, thus induced,—and this morbid sensibility is again mitigated or exasperated by the quality and quantity of our food and drink. The physician cannot cure the moral cause that preys upon the mind, and through that medium injures the body; but he can, in some measure, prevent the re-action of the body on the mind, by which re-action the moral affliction is rendered infinitely more difficult to bear. Thus a man loses by speculation a certain sum of money, which makes a considerable impression on his mind, and depresses his spirits. After a while he finds that TIME, instead of healing the wound which misfortune had inflicted, has increased it—and that, what he could look upon with some degree of fortitude in the beginning, is now become such a source of despondency that it haunts him by day and by night, and is for ever uppermost in his thoughts, and even in his dreams, if he can sleep. He finds, moreover, that sometimes he can view the misfortune with courage, and spurn the idea of giving way under it; while, at other times, it presents itself in the most frightful colours, and he seems completely deprived of all fortitude to resist its overwhelming influence. This is a true copy, of which I have seen many originals, during the late commercial distresses and ruinous speculations. What does it teach us? Why, that the moral affliction was borne with comparative ease till the digestive organs and nervous system were impaired through the agency of the mind, when these corporeal derangements impaired, in turn, the mental energies. But how are we to account for the fact that, one day the individual will evince fortitude, and the next despair—all the attendant circumstances of the moral evil remaining precisely as they were? It can be sometimes accounted for by the occasional irritation of food or drink exasperating the morbid sensibility of the stomach and nervous system, and thereby re-acting on the mind. This temporary irritation over, the mind again recovers a degree of its former serenity of firmness, till the cause is re-applied. I was led to this solution of the enigma some years ago, by observing that an aged Hypochondriac was every second day affected with such an exasperation of his melancholy forebodings, that he did nothing but walk about his room wringing his hands, and assuring his servants that the hand of death was upon him, and that he could not possibly survive more than a few hours. Under these gloomy impressions he would refuse food and drink, and, in fact, give himself up for lost. The succeeding sun, however, would find him quite an altered man. The cloud had broken away—a gleam of hope was re-kindled—and the appetite for food and drink was indulged too freely. Next morning, all would again be despair, and nothing but death

could be thought of. So he went on, as regular as light and darkness. But if, on the comparatively good day, he could be kept on a very small portion of food, and two or three glasses of wine, the next would be comparatively good also. This, however, could seldom be done; for as soon as he felt a respite from his miseries, procured by one day's abstinence, he returned to his usual indulgences, and again irritated his stomach and bowels, and through them reproduced despondency of mind. Another curious phenomenon was observed in this case, and, indeed, I have seen the same in many others:—namely, that any purgative medicine, which operated at all severely, brought on an exasperation of the mental depression and irritability of temper. He was always better when the bowels were constipated, than when they were relaxed—clearly shewing that whatever irritated the nerves of the alimentary canal, whether as food or as physic, increased the mental malady.*

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* Since the first edition of this Essay was printed, the Hypochondriac abovementioned, (a late General officer), paid the debt of nature, and that in a very sudden and mysterious manner. The day before his death he was in very good spirits, and played the violin, of which he was very fond, for several hours. The next was his bad day, and he did not get out of bed. Nevertheless he ate some dinner, and took two or three glasses of wine. In the evening he desired his butler to go down stairs to his tea, and leave him to take his siesta. In a quarter of an hour afterwards, when the butler returned, his master was dead!

This gentleman, whose talents and amiable qualities endeared him to a very extensive circle of friends, had presented, for twenty years, one of the most exquisite specimens of hypochondriacism which has, perhaps, ever been seen. General K——d had risen in India to the rank of chief engineer, and had led a life of great activity, mental and corporeal, till the age of 50, when he returned to Europe with an ample competence, and with the rational hope of realizing the wish of the poet and crowning—

"A youth of labour with an age of ease."

But, in Europe, he began gradually to experience hypochondriacal symptoms; to dissipate which, he rambled over France, Germany, Switzerland, Italy, and other parts of Europe—without being able to fly from his own wretched feelings. About ten years before his death, the hypochondriacism had risen to such a height that he declined going into society, though he still permitted his numerous friends to call upon him. His time was now occupied with the most minute attention to every sensation that he felt in any part of his body, from morning till night, with perpetual predictions of a fatal termination of his disease in a very short time. Gradually, however, the whole of his miseries concentrated themselves in the line of the stomach and bowels; and for seven or eight years he never would allow that he had one moment's respite from the most terrible degree of pain and other indescribable sensations in the rectum, colon, small intestines, or stomach. All the usual dyspeptic remedies were exhausted without producing any relief; and, as he still had his appetite, and did not waste in flesh, his complaints were considered by his friends to be imaginary, and they all set him down as a decided HYPOCHONDRIAC. Five years before his death, a stone was detected in the bladder, and now a hope was entertained that the key to his pains and other ailments was at length discovered. Sir A. Cooper removed the

I have known many instances where individuals, having this morbid sensibility of the gastro-intestinal nerves, experienced, after eating certain articles of difficult digestion, such a state of irritability of temper, that they were conscious of the danger they ran by the slightest collision or contradiction from even the nearest relations, and, therefore, avoided society till the fit went off. One gentleman in this state always caused his servants to tie his hands together, lest, in the paroxysm of irritation (without any ostensible cause), he should cut his throat or otherwise commit suicide. There was great difficulty at one time in keeping this gentleman from wine in excess. Tartar-emetic was, therefore, put into it unknown to him, and produced vomiting every time he took it. He persevered for a day or two, and then took such a disgust at his usual beverage that he could not bear the sight of it. This also effectually checked his appetite for food—and, for a time, there was almost a total cessation of the irritability of temper and paroxysms of agitation, till he got back to excesses of the table.

It must be confessed however, that there are some cases where this periodical or occasional exasperation of the despondency and mental discomfort cannot be traced to any errors in food or drink; as these exasperations will come on when the individual is adhering to the most strict and temperate regimen. It is difficult to account for such occurrences; but it is quite evident that they depend on some *physical* cause, probably at-

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stone, with his usual dexterity; but as soon as the wound was healed, all the sensations of pain in the digestive organs, and hypochondriacal symptoms gradually returned as bad as ever. The General now kept to the house, and every day was to be his last. Nothing except occasional abstinence in food and drink ever did him much good—but this abstinence invariably mitigated his sufferings, and relieved the depression of spirits and irritability of temper.

On examination after death, there was not a single vestige of disease to be seen in any part of the alimentary canal, from the stomach to the rectum. The brain also was sound, as were the lungs. The cause of death was a rupture of the left ventricle of the heart, occasioned by a small aneurismal tumour which projected from that chamber, and which was filled with layers of concrete fibrine. This little aneurismal projection gave way in the centre, and about eight or ten ounces of blood had been effused into the cavity of the pericardium, through a very small aperture. This disease, of which he never exhibited any symptom during life, and which no kind of auscultic investigation could possibly have detected, was not, I conceive, of long standing, or in any way connected with the state of hypochondriasis under which he had laboured for more than 20 years.

This case offers an illustration of the great length of time during which even a high degree of irritation and pain will continue in the stomach and bowels, without any cognizable trace being left after death. In the General's case, the pain was often so great in the line of the bowels, and especially in the colon, that opium, stramonium, and even belladonna, were ineffectual in subduing it. Could he have been kept on very restricted food and drink, his sufferings would have been greatly mitigated, and his life prolonged. He died at the age of 73, and a more amiable character never existed on earth. Peace to his manes!

mospheric, in the shape of malaria, acting on a nervous system, rendered unnaturally susceptible by the moral causes already described.* These returns of discomfort, while the patient is rigid in attending to the rules laid down for him, are very discouraging, and make him often despair of relief, and distrust the powers of regimen and medicinal treatment. All this is natural enough; but it may be a consolation to him and to his physician, to know that time and a steady perseverance in temperance will pretty *certainly* overcome the evil, when assisted by proper medicine. *Time* is required for the general nervous system to recover tone. Thus we see people, who have once suffered from ague, relapse occasionally for years afterwards, from causes which are often incognizable by the senses. Can we wonder, then, that when the nervous system of an individual has once received a severe shock, he should be liable to temporary relapses of despondency and irritability for a long time afterwards? In these cases, the nervous system is to be strengthened by every possible means, short of irritating the digestive organs. The sulphate of quinine will be found a valuable medicine in such cases.

In fine, it is impossible to enumerate the thousand ways in which different people are affected in their tempers and dispositions from this morbid sensibility of nerves—and that without any material feeling of discomfort in the very parts where the focus of morbid sensibility exists. They cannot, therefore, point out the causes of their wretched feelings, nor can their medical attendant always detect them. Their complaints are considered imaginary and pass unpitied—and the unhappy victim of a real physical malady, which preys on his vitals, is thus set down as a Hypochondriac, and so bantered and ridiculed by his friends, that the world is to him a purgatory, from which he has little regret in parting.

Sect. XI.—Treatment, dietetic, medicinal, and moral.

The pains which I have taken to investigate the causes and the nature of the class of diseases which has passed under review, will greatly abridge what I have to say as to the treatment. The real and efficient remedies are very few in number; and, in this respect, they form a striking contrast with the innumerable forms and phenomena of the disease for which they are prescribed. Speaking generally, I verily believe there is more harm

* During the last few years, I have been able distinctly to trace, in numerous instances, the disease in question, to malaria, that is, to the influence of a damp situation. It is probably on this account that mild tonics, aided by a proper diet, are so beneficial in restoring health.

than good done by the farrago of medicines which are eagerly swallowed by the dyspeptic patient, at a time, too, when his stomach will scarcely digest the lightest food.

I think I have proved that, whether there be ostensible disorder of the digestive function, or only the manifestation of morbid sympathies at a distance, or both at the same time, there is a morbid sensibility of the gastric and intestinal nerves; and, hence, the first and most important indication is to lessen that sensibility, by withdrawing the causes of irritation, and applying such remedies as have the effect of diminishing irritability. If the sources of irritation could be completely withdrawn, Nature would generally effect a cure, without the assistance of medicine. But as these are sometimes of a moral, as well as a physical nature, we have but little power over the former, and are, therefore, only able to mitigate the symptoms. As it is on the regulation of diet that our chief hopes of cure must rest, and as the system which I must insist on is rather rigid, I have endeavoured to shew the reason why this apparently severe discipline is absolutely necessary for a time, in order to stimulate the practitioner to fearlessly prescribe, and the patient to implicitly adopt it.

There is a great error committed every day, in flying to strong medicine at once, when the functions of the stomach and liver are disordered—the secretions unnatural—and the food imperfectly digested. Instead of exhibiting purgatives day after day to carry off diseased secretions, we should lessen and simplify the food, in order to prevent the formation of these bad secretions. In doing this we have great prejudices to overcome. The patient feels himself getting weaker and thinner during this preparatory course—and he looks to nourishing food and tonics for a cure. But he will generally be disappointed in the end by this plan. From four ounces of thick gruel, sago, or arrow-root, every six hours, he will, under some states of indigestion, derive more nutriment and strength, than from half a pound of animal food and a pint of wine. Whenever he feels any *considerable* additional uneasiness or discomfort in mind or in body, after eating, he has erred in the quantity or quality of his food, however restricted the one or select the other. If the food and drink irritate the nerves of the stomach, they must be reduced and simplified, down even to the extreme farinaceous diet above alluded to. I have known dyspeptic patients gain flesh and strength on half a pint of good gruel or arrow-root thrice in the twenty-four hours—and gradually bring the stomach, step by step, up to the point of digesting plain animal food and biscuit.* On six ounces of

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* I have again to protest against a misconception of my opinions, in respect to diet, which many readers have fallen into, since the first edition of this Essay was printed. Many have believed and said that I recommended people, whether ill or well, to live on water gruel. I certainly advise those who cannot digest any thing stronger than gruel, to live, *for a time*, on this simple nutriment, rather than keep up a constant irritation

animal food, with biscuit or stale bread, and a glass of water, with or without a spoonful of brandy, I have known invalids dine for months in succession, and attain, on this regimen, a degree of strength and a serenity of mind beyond their most sanguine hopes. In all or any of the various forms of indigestion which have been described, then, the diet is the first thing to be regulated. But it is quite preposterous to prescribe a certain quantity, or even quality of food and drink, till the power of the digestive organs is ascertained. I have repeatedly pointed out the criteria by which the patient, as well as the practitioner, may easily determine this important point. I care not if the dyspeptic invalid begins with a pound of beef-steaks and a bottle of Port wine for his dinner. If he feel as comfortable at the end of two, four, six, eight, or ten hours after this repast, as he did between breakfast and dinner of the preceding day, he had better continue his regimen, and throw physic to the dogs. But if, a few hours after his dinner, he feel a sense of distention in the stomach and bowels, or any of those symptoms of indigestion which have been pointed out—if he feel a languor of body, or a cloudiness of the mind—if he have a restless night—if he experience a depression of spirits, or irritability of temper next morning, his repast has been too much, or improper in kind, and he must reduce and simplify till he come to that quantity and quality of food and drink for dinner, which will produce little or no alteration in his feelings, whether of exhilaration *immediately* after dinner, or of discomfort *some hours* subsequent to this meal. This is the criterion by which the patient must judge for himself. The scale of diet must be lowered and simplified down even to water-gruel or arrow-root, if necessary, that is, if nothing higher can be borne, otherwise a cure can never be expected. Speaking generally, the dyspeptic invalid may commence the trial with from four to eight ounces of plain and tender animal food, with stale bread and few or no vegetables, at two o'clock, or as near that hour as possible, drinking, after the meal, a table-spoonful of brandy to two or three wine-glassfuls of water. If, after this, he feels light, and rather inclined to exercise or amusement than to take a nap on the sofa, he has hit the point—and to that system he should rigidly adhere. If he feel oppressed in body, or discomfited in mind, he must reduce the quantity gradually—if he feel a sense of emptiness, or faintness, or debility, he must increase the quantity of his food—but this will very seldom be necessary. If the weak

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in their digestive organs. But the moment they are capable of digesting animal food, I recommend it—and the quantity is to be gradually increased till a fair proportion is attained. A candid perusal of my statements must shew that I limit this rigid discipline to extreme cases, and that I recommend the scale of diet to be gradually increased up to a reasonable quantity and variety, whenever the organs of digestion are sufficiently strengthened to admit of this latitude in food and drink, with advantage, or even with impunity. If people will misconstrue my opinions after this, I cannot help it.

brandy and water will not be taken, sherry and water (a wine-glassful to the tumbler) may be allowed; but it is not so salutary as the former. Every thing that is taken beyond this, at dinner, is at the invalid's own peril—and if he prefer wretched health of body and mind to the momentary gratification of sensual indulgence at table, let not the physician give his sanction to such regimen. I have distinctly said that the invalid may eat and drink as much as he pleases—provided he experience no considerable *increase* of his morbid feelings from food and drink, within the twenty-four succeeding hours. If he *do* feel an increase of these, the necessity of the restriction which I propose is self-evident, and so far from being the imposition of a penance, it is, in reality, the removal of one.* Let it be remembered that I am speaking of the dyspeptic stomach, and not of that which is in the enjoyment of all its healthy powers and of all its natural sensibilities. To the man in health, and who takes regular exercise, almost every kind of food is wholesome, as Celsus remarked nearly two thousand years ago—"SANIS OMNIA SANA." But the invalid may ask—"can I not have my ailments removed without abridging my indulgences?" No! and the practitioner who undertakes the treatment under such conditions, betrays either a want of principle or a want of judgment.

Well, then, the patient adopts such a simple and abstemious plan of diet, that he feels no material augmentation of his sufferings after food; but still he is far from well. He escapes those periodical *aggravations* of his complaint; but the medium ratio of valetudinary health remains as before. There must be time for all things. Effects do not always cease in the living machine, when their causes are removed. It may have taken a long application of noxious agents and improper regimen to produce the morbid sensibility of the nerves, and it will require some time to reinstate them in their natural tone of feeling. Besides, the causes that originally produced the disorder may have been of a moral nature, and may still continue to operate. In this case, we can only prevent the aggravation of the complaint by proper diet, and mitigate the symptoms by proper remedies. The rest must be left to time and to moral means.

Although there is much peculiarity of disposition, in regard to diet, ob-

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* There will be found in practice a certain proportion of cases where we must modify this rule, on the principle that of two evils we ought to choose the lesser. Thus some people, if kept on so low a scale of diet as to secure them from discomfort in the stomach, will fall into a state of inconvenient *debility*. In such instances, we must raise the scale of diet, even at the expense of some discomfort. The judgment of the practitioner will here be put to the test. If he reduce the quantity of food too far, he induces debility—if he raise it too high, he will keep up irritation, and perpetuate disease. The happy medium can only be ascertained by a most careful examination of the individual, and of the effects of regimen and medicine. Of the two horns of the dilemma, it is certainly safer, in the end, to run on that which leads to *debility*, than on that which keeps up *irritation*.

servable in different individuals, and therefore some latitude to be allowed on this account, yet experience has shewn that, however the proper *quantity* of food may differ in different constitutions, there is one broad rule as to *quality*, which is seldom inapplicable to the great majority of dyspeptics.

The least irritating, and the most easily digested aliment, is unquestionably farinaceous food, at the head of which may be placed good grit-gruel. I have known many who could digest only this, without unpleasant sensations in the stomach, or some other part of the body. When such is the case, the nerves of the stomach are in a high degree of morbid sensibility, and great caution should be taken not to irritate them by premature attempts at more nutritious food. No person is in danger of starvation who can take and digest a pint—or even less, of good gruel in the twenty-four hours. Arrow-root, sago, tapioca, rice, salep, are all in the same class; but few of them will bear repetition so well as gruel. A little sugar, and a tea-spoonful of brandy in each cup of the gruel may be permitted.*

When the nerves have been kept free from irritation for a short time by this mild regimen—when the tongue cleans—the appetite returns—the sleep becomes more refreshing—and the intellectual, as well as the corporeal feelings and functions more tranquil, beef-tea may be used with well toasted bread—then a small quantity of chicken or mutton ventured on, and gradually increased. Whenever any very uneasy sensations of mind or body occur, within the 24 hours after this trial of animal aliment, it should be decreased; or, if that will not do, wholly omitted, for a time, and the farinaceous food resumed. If no bad effects follow, the quantity of chicken or mutton may be progressively increased to six or eight ounces, with stale bread—but not too much of that. No other vegetable matter can yet be safely ventured on. While the farinaceous regimen is necessary, little or no drink should be taken, unless thirst be felt, when barley-water or toast and water, in small quantity, may be allowed. When the chicken or mutton can be borne, the drink should vary in quantity, according to the feelings of thirst, and the number of ounces of the animal diet which can be tolerated. Thus, if the patient cannot take more than an ounce of animal aliment, a wine-glassful of water, with a tea-spoonful of brandy in it, is as much as should be taken after the repast, unless thirst should urge, when some toast and water, with a very little, or without brandy, may be taken. If eight ounces of mutton can

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* There are many individuals who cannot take gruel, without its turning acid on the stomach. It should then be discontinued, and some other farinaceous food, as rice or other plain pudding substituted. Panada, with a little brandy or wine, will sometimes agree when the gruel and other farinaceous substances disagree. Soujee, an oriental grain, now procurable in most shops, is an excellent farinaceous food.

be borne with impunity, a tumbler of water, with a table-spoonful or two of brandy, is a fair allowance, or a glass or two of good wine.

From poultry and mutton, the dyspeptic should cautiously ascend to game and other species of animal food—dressed in the simplest manner, and still with stale bread or biscuit. I would strongly advise that the *quantity* should never exceed half a pound in weight, even when that can be borne without a single unpleasant sensation succeeding. This is quite enough, and often too much for an invalid, who frequently acquires a degree of strength and firmness, though not fulness of muscle, on this quantity, which in time surprises his friends, as well as himself. When arrived at the power of *digesting* six or eight ounces of meat, he may vary the kind of animal matter considerably. Lamb, hare, tender beef, tripe—nay, venison, may be taken, provided the golden rule be observed of always keeping to that *quantity* which produces *no languor after eating—no unpleasant sensation of mind or body during digestion.** I cannot urge this rule too strenuously on dyspeptics. Their happiness—perhaps their welfare—and the happiness and welfare of many who are connected with them, depend on its strict observance.

It is needless to dwell on the endless catalogue of *improper dishes,* as soups, stews, ragouts, &c. Almost all are improper for the dyspeptic, or at least doubtful, if not *dangerous,* that are not included in the above list. Even a mealy potatoe will often irritate the nerves of the stomach (without any perceptible sensation *there*), and pass undigested, after producing a great deal of wretched feeling in distant parts of the body. The same may be said of every kind of fruit and vegetables. There is such a tendency to acidity in the weak and irritable stomach—vegetable matters are so prone to ferment and acidify—and acid is so peculiarly offensive to the morbidly sensible nerves of the alimentary canal, that the dyspeptic invalid cannot be too much on his guard against fruit and vegetables of every description, however innocent they may seem to be, as connected with disagreeable feeling in the stomach itself. In general, however, plain puddings, made of bread, ground rice, tapioca, and the like, are admissible, when the stomach has recovered some degree of tone; but when made

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* It may seem strange that I have not included *fish* in the list of edible matters for the dyspeptic. But, in truth, it is a very precarious species of food, for weak stomachs. Salmon is extremely improper, and even the white fish is very apt to turn rancid and greatly irritate the gastric and intestinal nerves. I would advise the dyspeptic invalid to be cautious of fish. Without butter or other sauces it is insipid—and with these additions it is seldom safe. I have known very serious attacks of indigestion, in its febrile form, produced by turbot and even cod. Shell-fish, as crab, lobster, and oysters, are, in general, much less injurious, and can be borne without detriment by the dyspeptic stomach, when the irritability of its nerves has been a good deal subdued by a proper course of diet and medicine previously.

with raisins, currants, or other dried fruit, together with eggs, and the various *et ceteras* of refined cookery, they are dangerous articles of food for the dyspeptic. As for cheese, pickles, nuts, onions and a variety of provocatives, they are generally injurious in dyspepsia, and as such should be avoided. In proportion as strength of stomach returns, well-boiled vegetables, and especially a mealy potatoe, may be cautiously tried.

In respect to drink, my firm conviction is, that water is the best; and that, until the habit of water-drinking can be acquired, a dilute mixture of brandy and water is the next best beverage. Still I have no objection to a glass or two of sherry, under the guidance of the criteria which I have so often laid down. The sooner, however, that every species of stimulating drink can be laid aside, the better. A cup of coffee after dinner is far preferable to wine. Malt liquors are very questionable, except in particular constitutions.

It is a certain fact, however, that more mischief is done, in general, by too much food than by too much wine. The latter stimulates the stomach, and the whole system no doubt, but it is soon discharged from the stomach, and from the body altogether, by the various outlets. Not so the food, if in too large a proportion. The stomach and bowels are oppressed by the undigested part—or over-exerted in the process of digesting more than is necessary, and the consequence is, that gastric and constitutional *irritation*, much worse than vinous *stimulation*, is kept up for a long time after each immoderate meal.

The other meals are of some consequence to be attended to by the dyspeptic invalid. In the morning, if the nervous irritability is not in the highest degree (necessitating the use of gruel), coffee, cocoa, or good black tea, with well-toasted bread, cold, and with very little butter—or, what is better, with a little cold or hot meat, may be taken, and nothing more till dinner, if at two o'clock. Where tyrant custom compels to dine late, a slice of meat and biscuit, or some bread and butter, should be taken at one o'clock. The tea should be the same as the breakfast, but generally without animal food:—And a cup of gruel, sago, or panada, with a spoonful of brandy, is the best supper. Where dinner is taken at an early hour, however, a slice of meat, with a little biscuit, and some weak brandy and water, or sherry and water, may be necessary in some constitutions, before going to bed. Many people cannot sleep, if they go to bed with an empty stomach; and as sleep is of such great importance to the invalid, it should not be prevented by the want of a slight repast at bed-time. I am no advocate for unnecessary restriction. The feelings of nature are to be always attended to—but not the *immediate* feelings of comfort alone—the *subsequent* sensations are to be taken into account. Where farinaceous food can be relished for breakfast (as gruel and milk, oatmeal porridge and milk, bread and milk, &c.), it is certainly better than tea. The milk or cream should be sparingly used

with this last beverage. Many dyspeptics breakfast best on a mutton-chop and stale bread.

By adherence to the foregoing plan, varying the quantity according to the feelings subsequently experienced, the surest foundation is laid, not only for health, but for happiness. Upon a regimen of this kind, with proper exercise, the body will be brought to the greatest degree of permanent muscular strength of which the individual constitution is susceptible—and the intellectual powers will be raised in proportion. Equanimity of mind will be attained, if attainable at all; and where moral causes of irritation or affliction cannot be avoided, they will be greatly neutralized. Under such a system of diet, the corporeal frame will be rendered more capable of undergoing fatigue—and the mind more able to resist misfortune, than by the richest dishes and most luxurious wines.*

The rigid system which I have proposed is not the creature of speculation, engendered in the closet. It is that which many, to my knowledge, have adopted with the most perfect success—it is that by which I have conquered the most intense degree of dyspepsia in my own person. Those who have courage and perseverance to reap the fruits of such a system, will hardly be induced to change it too soon, however strongly they may be tempted by the luxuries of the table, and the seductions of convivial society. It would be well for those in the enjoyment of present health, if they employed a certain degree of it as a preservative of that invaluable blessing! but this I do not expect. I am addressing those who have tasted the bitter cup of sickness—and especially those who have experienced the horrors of dyspepsia. The latter alone can appreciate the luxury of immunity from the terrible feelings of mind and body, engendered by that worst of human afflictions.

Before quitting the subject of diet, however, I would seriously advise those whose situations in life subject them to great mental exertion, as well as trials of their fortitude, to make use of this abstemious regimen when more than usually oppressed by intellectual labour or tribulations of mind, instead of flying to the stimulus of wine and savoury aliments, as temporary recruits for the exhausted spirits. This last is a dangerous expedient, and fails at all points. The prize-fighter and the pedestrian live abstemiously when preparing for feats of corporeal activity. The candidate for intellectual prizes must pursue a similar course, if he mean to be victorious in the end. Both experience and observation have convinced me that the mind can undergo a greater quantum of

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* Captain Head states that, when he commenced his travels in South America, he was quite unable to undergo the necessary exertion, till he adopted the plan of living on plain animal food and water only. He could then, in a short time, tire out many horses in his equestrian journeys.

labour when the body is kept in an unexcited state, than when stimulated by the luxuries of the table. The same remark will apply to those who have become the victims of misfortune. Let them not fly to the momentary solace of *stimulants,* which only consume more rapidly the taper of life, and render them less able to bear the vicissitudes of this world.

When a man has escaped the miseries of dyspeptic feelings, and brought the sensibilities of his stomach to a natural state, by great attention to diet, he should be careful how he deviates too soon from the rigid regimen by which he was restored to health. Nothing is so liable to relapse as dyspepsia—and indulgence in variety of dishes, or vegetables and fruit, with bad wines, will be almost certain of making the individual pay dear for the experiment. But it is of still more importance to keep to a low *quantity* of food. The least over-exertion of the stomach in mastering a larger proportion than it can easily digest, will be sure to rekindle the morbid sympathies of the body, and the wretched feelings of the mind. The patient must always balance between irritation and debility. When he feels irritation, he must lessen and simplify his food—when he experiences much debility, he must increase it. The false debility, or rather feeling of debility, already described, must not be confounded with real debility.

Sect. XII.—Medicinal Treatment.

The foregoing rules of diet will pretty generally apply to most cases and stages of dyspepsia, whether consisting in morbid sensibility of the gastric nerves, without apparent disorder of function; or accompanied by the various symptoms of indigestion and biliary derangement. It will, also, apply to what has been termed "inflammatory dyspepsia," equally as well as to that which is denominated "nervous." This dietetic regulation is the basis of the treatment. Without it, no effectual cure can be accomplished—and by it alone, nine cases in ten of common indigestion, in its earlier stages, might be removed. But much auxiliary assistance may be derived from a judicious application of medicine.

After adjusting the subject of diet, our attention should next be directed to the state of the secretions. The mode of ascertaining their *habitual* condition is too often erroneous. Thus, a brisk purgative is given, and then the secretions are examined. But the same medicine, if given to a person in health, would very frequently evacuate matters that would be considered morbid. Besides, the action of purgatives will often rouse the liver and other glands to pour forth secretions very different in quantity

as well as quality from what are habitually secreted. The secretions cannot, in fact, be ascertained by one or two inspections. They should be examined when medicine has been taken, and when no medicine has been taken. They should also be examined after the operation of different kinds of medicine. Mercurial aperients will bring down bile that is habitually defective.—Rhubarb will tinge the secretions yellow that were previously pale—magnesia will render the motions pale that were formerly dark-coloured—salts will expel watery motions—aloes, solid evacuations. From this it will be seen, how necessary it is to think a little before a plan of medicine is determined upon.

When there is unequivocal disorder of function in the liver and digestive organs, as ascertained by the symptoms already described, it will generally be found that the secretions are unhealthy. The change of diet will, in itself, greatly correct this morbid condition of the secretions—but, in the mean time, they must be daily removed from the alimentary canal, in order to take away one source of irritation.

In doing this, much caution is necessary. Infinite mischief, as I have stated before, is daily occasioned by the indiscriminate employment of strong purgative medicine, in dyspeptic complaints. Bad secretions may be thus *removed*, but their reproduction will never be thus *prevented*. It is by withdrawing the sources of irritation, and gradually improving the functions of the liver, the stomach, and the intestinal canal, that the formation of morbid secretions can be arrested. Purgation, therefore, should be cautiously employed. It may be proper, just at the beginning, to clear the alimentary canal of all its lurking contents; but, after this, I do maintain that the main object is to produce but one evacuation daily, and that of a solid, rather than a liquid consistence. If practitioners knew the misery that is often produced by irritating cathartic medicines in dyspeptic and hypochondriacal complaints, in this country, they would be more sparing than they are of their calomel at night and black-draught in the morning.

Experience has shewn, that there are some medicines which produce little irritation in the stomach and upper bowels, and act principally on the colon and rectum, as, for intance, aloes and sulphur. Jalap, calomel, salts, senna, antimony, and many other purgatives, produce a good deal of disorder in the stomach, and along the whole course of the alimentary canal, causing a copious secretion from the glands and secreting surfaces of these parts, as well as of the liver. They are very useful upon occasions, to remove all offending matters, but should not be too often employed. A combination of several different kinds of aperient medicine, that will act mildly, but gradually, along the whole line of the digestive apparatus, is far preferable to any one medicinal substance. Simplicity of prescription is very generally, on this point, accompanied by insufficiency of the effect designed. In dyspeptic cases, and especially where there is mor-

bid sensibility, in any considerable degree, in the stomach and bowels, it is of great consequence to join hyosciamus, or some gentle anodyne with the aperient. When the morbid sensibility is not in great degree, the anodyne may be left out. The following formula may be found pretty generally applicable as an habitual aperient. It contains a very minute portion of mercury, and which may be taken with safety.

℞. Ext. Colocynth. Comp.
Pil. Rhei Comp..... āā ℈ij.
Pil. Hydrarg. ..... gr. xx.
Sapon. Venet..... gr. iv.
Ol. Caryoph. ..... gt. iij.
M. ft. Pil. xx. Capiat j. ij. vel iij. horâ somni, vel statim ante prandium.

These pills should be taken according to the effects they produce. If one be sufficient to procure one easy evacuation the succeeding morning, well and good. If not, two, three, or any number may be taken, so as to effect the purpose desired. If much irritation prevail, from three to five grains of extract of hyosciamus may be taken at night with the pills.

There will be many cases where the irritability of the stomach and bowels will not bear more than a few grains of rhubarb and magnesia, without producing much distress. Where acidity prevails much, with disposition to pain and flatulence in the stomach, some carbonate of ammonia, or the spirit. ammoniæ aromaticus, should be conjoined with magnesia and rhubarb.*

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* The pain produced in the stomach by acidity is very distressing; but this pain is not seldom owing to a very different cause, namely, a *rancidity* of the contents of the stomach, which soda, magnesia, and chalk, will not remove. In some instances, which have lately come under my notice, the pain in the stomach, and the discharge of clear water from the mouth, were ascertained to be owing to the presence of an extremely acrid alkali, which strongly effervesced with, and neutralized acids. One of these cases was that of a medical gentleman, who analyzed the fluid discharged from the stomach, and found it to be a strong alkali, which effervesced with, and neutralized sulphuric acid. In some of these cases, the mineral acids and bitter tonics were successfully employed, and all fat animal food avoided. Where heart-burn, therefore, exists, we should endeavour to ascertain whether it is owing to the presence of an acid or an alkali in the stomach. The nature of the diet used, and the effects of magnesia or other absorbents taken into the stomach, will readily elucidate this question, independently of any analysis of fluid discharged. It is wonderful, indeed, what a variety of strange and irritating secretions will be generated in the alimentary canal, when the nerves are disordered, and the digestive process imperfect. The only *radical cure* is a restitution of vigour to the organs of digestion—especially the stomach and liver. I was informed by a medical friend and patient, that he has found *cream* a specific for heartburn in some of these cases; and in several instances, of late, I was able to verify this statement.—*9th Edition.*

But, in fact, there is great difficulty in adjusting the aperient to the state of the case, so as to fulfil the essential indication—that of moving the bowels once daily—and always with as little irritation as possible. Whenever thin, watery, or slimy motions are produced, more harm than good will be done.

In proportion as the biliary secretion is deranged, the quantity of the mercurial must be increased,* but where there is no appearance of the liver being in fault, the less mercurial the better, especially where the nerves of the stomach exhibit symptoms of much sensibility.† In such cases, the taraxacum (dandelion), and also the sarsaparilla, will be found very advantageous, either singly or combined. The proportions and combinations must vary, according to the nature of the case.‡

The decoction of the fresh root of dandelion, four ounces to the pint, with some ginger and supertartrate of potash, forms a very useful medicine, where the biliary secretion is defective, and the urinary secretion loaded and scanty. The dandelion increases both secretions, and tends to keep the bowels open.

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* It may, in some cases, be prudent to touch the mouth with mercury; but then the disease is HEPATITIS rather than DYSPEPSIA. When this course is necessary, the patient should be apprised of the circumstance, and warned to keep himself confined to the house, till the medicine is no longer required. Where dyspepsia attends the hepatitis, as is almost always the case, the blue-pill is preferable in this country to calomel, and should be gradually, but steadily introduced till the mouth becomes sore, or the evacuations yellow and feculent. When this takes place, the symptoms of hepatitis generally vanish. It is in such cases that the nitro-muriatic acid bath, applied to the feet, legs, and arms, is often of very considerable benefit. This remedy, like most others, was over-rated on its first introduction, and has, consequently, fallen almost entirely into disuse—unmeritedly so. Its application is attended with too much trouble for patients and practitioners in general; and this is one cause of the infrequency of its employment. It is not so well calculated for the morbid sensibility of the stomach and bowels, of which I have been treating, as for a torpid state of the liver, a paucity of bile, and a constipated state of the bowels.

† The following formula is without any mercury:—

℞. Extr. Col. Comp. ..... ℈ij.
Pil. Rhei Compos. ..... ℈j.
Saponis .... gr. vj.
Ol. Caryophill. ..... gt. iv.
Misce, ft. Pil. xvj. Capt. j. ij. vel iij. horâ somni.

‡ Formula:—

℞. Decoct. Taraxaci ..... ℥vij.
Extr. Taraxaci ..... ℈ij.
Carb. Sodæ ..... ℈ij.
Extr. Sarsæ ..... ℥j.
Tinct. Gent. Comp. ..... ℥ss.
Misce, et capt. coch. ij. mag. bis die.

Before taking leave of the subject of aperients, I may add, that the use of injections as auxiliaries, should not be neglected. In high grades of gastric and intestinal irritability, it is hardly possible to give any aperient by the mouth—even castor oil—without producing disagreeable effects; and here the employment of injections is of great advantage. The rigid system of diet is our sheet-anchor, till the morbid sensibility of the nerves is lessened or removed, and then aperients may be used with greater safety and greater latitude, as well as an increased allowance of food.*

But are we possessed of no means of reducing this morbid sensibility of the nerves, in addition to the plan of unirritating diet? We certainly can greatly assist the dietetic regimen by other means. The effect of counter-irritation is often very conspicuously beneficial. A small plaster of tartar-emetic and Burgundy pitch applied to the pit of the stomach is one of the most powerful counter-irritants we possess, and is far superior to blisters. A scruple of the tartrate of antimony to each drachm of the Burgundy pitch, will, in two or three days, produce a copious crop of pustules, which will continue to discharge for a week afterwards, and afford much relief. I have no objection to a few leeches being previously applied to the part, especially if much tenderness is complained of on pressure:—for although irritation and inflammation are two very

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* The white mustard-seed has lately attracted considerable attention; and I have known a great number of dyspeptic invalids take it—some with apparent advantage, others without much effect—and in a very few instances it appeared to do harm. It certainly is not calculated for a very irritable state of the gastric and intestinal nerves—since all spicy or hot aromatic substances are injurious in such cases. It is where the bowels are very torpid, the appetite bad, and the whole system languid and sluggish, that the white mustard-seed promises to be serviceable. If it keep the bowels open, and produce no unpleasant feeling in the stomach, alimentary canal, or nervous system, it may be taken with safety. If it do not produce an aperient operation, it can do little good, and may, perchance, do mischief.

Since the first edition of this Work was published, Dr. B**** (I believe) has issued a pamphlet on the subject of white mustard-seed, in which he undertakes to prove, both by experiments and observation, that this far-famed nostrum is almost entirely destitute of any medicinal quality—that it hardly ever proves aperient, but, on the contrary, has a tendency to constipate the bowels—that it causes much irritation in the first passages—and that from it is disengaged a quantity of sulphuretted hydrogen gas, which communicates a most abominable odour, not only to the secretions, but to the breath and the perspiration, thereby rendering the individual loathsome to himself, and disagreeable to his neighbours. I am afraid the character drawn of the white mustard-seed by Dr. B. is not much overcharged. I have seen very few unequivocal good effects from this substance, for the accounts given by patients are often deceitful, and, at all events, a pungent seed of this kind, where it does not carry itself off by an aperient quality, must, in numerous cases of gastric and intestinal irritation, be productive of mischief, of which, indeed, I have recently seen two or three proofs. The remedy, however, is rapidly losing its reputation.

different conditions, and require different treatment, yet the former sometimes leads to the latter, and we frequently see the two combined. On this account, the application of a few leeches is a safe precursor to the counter-irritation. Small doses of the nitrate of potash, in common effervescing draughts, are also very useful in such states.*

Where irritation of the whole nervous system depends, as it often does, on irritation of the stomach, it will sometimes be necessary to keep up a steady, but gently soothing effect on the gastric nerves, by anodynes, combined with small doses of blue-pill. The biliary secretion is sometimes so acrid, that the patient is sensible of its descent into the duodenum, and experiences the most indescribably disagreeable sensations at the time—producing a kind of shudder through the whole frame, and a radiation of morbid feelings from the region of the duodenum in every direction. This I experienced myself, and was quite satisfied that it proceeded from the contact of bad bile with the morbidly sensible nerves of the duodenum. In such cases, two grains of extract of hyosciamus, one grain of blue-pill, and two of the compound powder of ipecacuanha, every six or eight hours, will keep the irritation in check, and help to correct the vitiated state of the biliary secretion. With these medicines, a little rhubarb and magnesia at night, merely to ensure one action of the bowels daily, is all that should be taken—and this only when the bowels will not act spontaneously.

Bearing in mind the intimate sympathy between the external surface of the body and the internal surface of the alimentary canal, the tepid bath is an important remedy, as a soother of irritability. The forenoon or the evening is the time to be selected, and the subsequent feelings of the individual will be the best criterion for its repetition. When a little farther advanced in convalescence, the shower-bath is a powerful auxiliary to the means already described. At first it should be tepid, and gradually reduced to cold.

I now come to an important class of remedies for the lessening of morbid sensibility of the nervous system—namely, the vegetable bitters and tonics. The state of the appetite being a pretty fair index of the state of digestion,† experience, in all ages, has confirmed the benefit to be

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* Formula :—

℞. Carb. Sodæ..... ʒss.
Nitrat. Potassæ ..... ʒj.
Ant. Tart. ..... gr. j.
Sacchari puri ..... ʒss,

Misce ft. pulv. xj. capt. j. bis terve in die, ex cyatho aquæ, cum coch. j. mag. succi limonis recentis in actu effervescentiæ.

† This must be understood with some restriction. The appetite often outstrips the digestion, and thus proves an unfortunate, or even a dangerous temptation to the invalid. If a dyspeptic does not leave off with some inclination to eat more, he

derived from this class of medicinal substances in dyspepsia, when carefully managed. It is a well-known truth, that debility is the parent of irritability, and it is on this principle only that tonics can be safely employed. But when irritability is great, tonics do more harm than good; and, in fact, increase instead of diminishing the morbid sensibility of the stomach and bowels. On this account, they cannot be safely employed till the irritability is reduced to a certain point by mild diet and by soothing medicines, when they may be applied with the most decidedly good effects. If they are given before this reduction of morbid sensibility, they produce great disturbance in the system, and I am confident they frequently change irritation into inflammation. In this case, as in the case of food, the feelings of the individual are unerring criteria of the salutary or noxious effects of bitters and tonics—and these should be scrupulously attended to by the patient and practitioner. Many hypochondriacs have been driven into a state of insanity by the stimulation of wine and tonics, when the morbid sensibility of the stomach was in a high degree. Wine and tonics, like opium, will overpower the sensibility of the nerves for a few hours, in these cases, and some sleep may follow—but the terrible exasperation of irritability which succeeds, when the first effects of stimulation are over, have produced many an act of suicide, besides the thousand lower grades of mental misery, to which the unfortunate dyspeptic and hypochondriacal invalid is subjected by injudicious treatment. The dreadful depression of spirits and despondency of mind, resulting from this temporary exhilaration and excitement, are so much the more dangerous, as they too often lead to a repetition of the baneful causes that produced them. There is no point in practice which requires so much caution and skill in the practitioner as the exhibition of this class of remedies in dyspepsia and hypochondriasis. The mode of administering bitter tonics will be presently described, after premising a few observations on a preparation which I have sometimes employed with success in irritable states of the mucous membrane lining the stomach and bowels.

I have now to draw the attention of the profession to a medicine, which I believe has never been employed in this class of diseases, but which, I apprehend, from what I have already seen, will be found a

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generally suffers for it before twenty-four hours elapse This sacrifice of a few ounces of food, short of satiety, is well repaid by the comfortable feelings in the evening. Indeed, I have found that, in a considerable proportion of dyspeptic cases, there is a voracious and almost insatiable appetite at the very time when the stomach is in the worst condition. In two or three instances, a very limited quantity of food prevented this voracity—whereas, if a full meal was indulged in, there was a canine appetite in the course of a few hours afterwards! This state of things appears to result from an inordinate secretion of unnatural gastric juice, or some vitiated fluid.

very valuable remedy.* It is well known to surgeons, that the nitrate of silver is one of the most powerful means of allaying irritability, when applied externally to painful and irritable sores. It is also well known that this medicine may be given internally to the extent of several grains daily, for months in succession, in cases of epilepsy, and that without producing any bad effect. Indeed, it is now almost the only remedy on which any dependence is placed in the above-mentioned formidable complaint. My attention was first excited towards its effects on the stomach and bowels, some years ago, while exhibiting it to a young gentleman employed in a public office of this metropolis, who laboured under epilepsy, and who, at the same time, had the usual symptoms of dyspepsia, and great irritability of the stomach and bowels. Considering the latter complaint as one of minor consequence, I gave the nitrate of silver alone, beginning with half a grain thrice a day, in crumb of bread, and gradually increasing it to two grains thrice in the 24 hours, beyond which I did not carry the dose. After the first month he had no return of the epilepsy; but the medicine was continued till the expiration of three months, when it was finally left off. He took no other medicine whatever; and in the course of the three months he was completely cured of all his dyspeptic symptoms. I was a good deal surprised at this event, and was at a loss to account for the result. But several cases have since occurred, which lead me to think, *first*, that epilepsy very often depends on morbid sensibility of the gastric and intestinal nerves—and, *secondly*, that it is by removing this morbid irritability of the alimentary canal, that the nitrate of silver sometimes cures epilepsy. We know, for instance, that convulsions and epilepsy are frequently produced by worms in the first passages, although no symptom of *sensible* irritation or pain may exist there at the time—the worms producing the phenomena above-mentioned by their action on the special or organic sensibility of the parts, and thence, by sympathy, on the brain and spinal system of nerves. The removal of the worms cures the convulsions and epilepsy, by removing the cause of irritation—and the nitrate of silver very probably acts, in other cases, by lessening the sensibility of the nerves, and thereby rendering them unsusceptible of irritation. On this principle, I have administered the nitrate of silver, of late, in cases where the morbid sensibility of the gastric and intestinal nerves was produced by other causes than worms, and gave rise to other phenomena than epilepsy, and hitherto with

* Since the first edition of this Work was published, I was a little surprised by a gentleman presenting me a prescription for dyspepsia, which had been given him by a physician on the coast some years ago, containing the nitrate of silver. I am very glad to find this coincidence, although it proves an anticipation of my employment of the remedy.

marked advantage. I have lately exhibited the same medicine, in combination with small doses of quinine, to many patients affected with obstinate dyspepsia, in that form which is more marked by the morbid sympathies of distant parts than by *apparent* disorder in the stomach and bowels themselves, and I have reason to believe, that the effects will be most beneficial. In one case, indeed, that of an elderly clergyman, who had, for some years, laboured under a number of anomalous symptoms of a very distressing nature, especially affecting the head, the organs of sense, and the powers of the mind, but in whom the stomach and bowels exhibited marks of morbid sensibility, the nitrate of silver and sulphate of quinine have been productive of the greatest relief, and I may say that he is completely cured.

I know too well the fallacies of medicine to hold this remedy up as a specific for removing morbid irritability of the primæ viæ; but I think I may safely recommend it to the notice of my professional brethren, as an *auxiliary* in such cases, which it may be worth their while to try. It may be exhibited in the form of a pill at night, combined with any bitter or aperient extract. It will not interfere with the operation of almost any other medicine with which it is administered. Thus, half a grain of nitrate of silver, and two, three, or four of extract of hyosciamus, may be given every night at bed-time, and the dose gradually increased to two or three grains daily. No inconvenience can possibly result from the administration of the medicine, if not continued beyond two months at a time.* But I must remark on this, as on almost every other medicine, that unless the strictest attention be paid to diet, all medicines will fail. I

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* In the first edition of this Essay, I did not state my reasons for limiting the exhibition of nitrate of silver to two or three months, thinking the reason was sufficiently known among medical practitioners, by whom alone the medicine should be administered. In several cases, where the nitrate of silver has been given for five, six, and seven months, without intermission, the complexion has been changed into a dark hue; and, on this account, the limits of three months have been prescribed, by general consent, of late years. A case has lately occurred at Brighton, where a gentleman has lost his fair complexion by a long-continuance of the remedy; and, I understand, he is in high dudgeon with his medical attendants. The object was the cure of epilepsy; and in this business I had no concern. I can assert, however, without fear of contradiction, that there is no instance on record, where the complexion has been affected by the medicine when restricted to three months' administration. In cases of common dyspepsia, I should never dream of giving it all; and in obstinate cases, for not more than a month or six weeks. In epilepsy, I have given it to at least fifty patients, and never had the slightest reason to regret the practice, as I always stopped its employment at the end of three months, whether the disease was cured or not. No other objection has ever been urged against the nitrate of silver in epilepsy, and, God knows, the "tincture of the skin" is a trifling evil, compared with a disease which every day endangers life, and almost certainly ends in loss of reason! But even this "tincture of the skin" is avoided with perfect security, by the precaution above-mentioned.

P. S. During the last 12 or 18 months, I have been using the oxyde of silver, which does not, I believe, blacken the skin.

particularly wish to be understood as recommending the nitrate of silver only as an auxiliary in a complaint which often baffles the practitioner, and where all auxiliaries are occasionally needful. The quinine may generally be given at the same time, not in pills, but in solution.*

In respect to bitters and tonics, as a class of remedies calculated to lessen morbid sensibility, and improve the function of digestion, there can be no doubt as to their utility, when given at the proper period. Of late years, I have found in the sulphate of quinine, most of the good properties of the other tonics, devoid of their bulk and other nauseating qualities. It is, perhaps, the only tonic which we need in general, and it must ultimately supersede most others. In small doses, as half a grain, thrice a day, dissolved in a tea-spoonful of any bitter tincture, as the compound tincture of gentian, and diluted with a little toast-water, or any other fluid, it has an excellent effect on the stomach, soothing its nerves, cleaning the tongue, improving the appetite, strengthening the digestion, and imparting tone and tranquillity to mind and body. If given in larger doses, especially at the beginning, it stimulates too powerfully, and may do harm. It should, therefore, not be exhibited, till irritation is lessened by the subduction of improper food and the administration of proper medicines: and then it should be commenced in small doses, very gradually increased, and its effects on the feelings watched as in respect to food. Managed in this way, it acts with surprising efficacy, and it is not unusual for it to produce such a change in the appearance of invalids in a month or two, that the same person is hardly known. It should not be always given in pills, as it is sometimes liable to pass undigested in such forms, and thus disappoint the practitioner. Its effects are wanted on the *stomach* rather than on the *bowels*, and when medicines are designed to operate on the former organ, they should generally be given in a liquid, or in a very soluble form, which is not the case with pills, unless made soft, and used the day they are compounded.†

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* A medical gentleman told me, with an air of importance, that the nitrate of silver was decomposed by the mucus of the stomach, and that consequently I was deceived as to its medicinal operation. It is hardly worth while to make any reply to this observation. Do we not see the nitrate decomposed the moment it touches a sore? Is it of no efficacy on that account?

† The disease termed chorea, or St. Vitus's dance, is generally admitted as dependent on irritation of the primæ viæ, and hence the practice of Dr. Hamilton, which consisted almost entirely in purgation. But experience has now shewn that this plan will not always, perhaps not generally succeed. By it, we clear away irritating matters, it is true; but the morbid sensibility remains, and our work is only half done. Hence, the superior success which has attended the practice of following up the purgative plan by bitters and tonics. The former (purgation) removes the irritants—the latter (bitters and tonics) the susceptibility to the action of future irritants.

In those distressing complaints, which shew themselves by *periodical* pains about the head, face, or other parts of the body, and which appear to be grades of TIC DOULOUREUX, on intermittent irritations, a combination of quinine, carbonate of iron,

It is useless, as indeed, it would be endless, to enter into an examination of the farrago of bitters, tonics, stomachics, and other remedies which have been recommended, and are daily employed in the various forms and shades of indigestion and hypochondriasis. All the indications which they are capable of fulfilling may be fulfilled, in my opinion, by the few which I have pointed out—and why need we have recourse to subordinate agents, when the principals are at command.

But as I have taken great pains to explain the *nature* of this class of diseases, and the *objects* which it is desirable to obtain, so it would be waste of time to dwell on the minor means of effecting these objects. They will suggest themselves to every medical practitioner, and none but medical practitioners should attempt the treatment of a class of maladies which requires the utmost skill to manage. The dietetic regimen, indeed, may be put in force by any invalid, under the guidance of the rules I have laid down; but let him beware how he meddles with the medical management of his complaint. If the indications to be fulfilled demand the minutest attention of the medical practitioner, how is it possible that the patient can judge of such difficult matters.

The subject of exercise, though, strictly speaking, a physical remedy, and one of great importance in this class of disorders, especially in hypochondriasis, will be glanced at presently under the head of moral remedies, with which it is usually associated. The shower-bath is a remedy during convalescence from stomach-affection, which produces powerful effects when properly managed. It should be commenced with caution, and the temperature of the water gradually reduced, till it comes to that of the atmosphere at the time. The tonic effects of the shower-bath are communicated to the stomach, but, like tonics internally, it is not to be used till morbid sensibility is subdued by diet and medicine. It may then be employed as a powerful preservative from relapses, provided regimen be attended to at the same time. The best time for using it is in the forenoon.

As to the host of symptomatic affections of different parts of the body, originating in disordered conditions of the digestive organs, it is unnecessary to dwell on their treatment in this place. While they are *merely sympathetic* (as they generally are), they require no other method of cure than that which is necessary for the removal of the disorder on which they depend—and when they become organic affections, and independent of the cause which first produced them, their treatment will not differ from that employed for original or idiopathic affections of the same organs or parts. The symptomatic disease of the lungs will be fully con-

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and Fowler's solution, will often conquer the disease, when either or all of these medicines fail separately. Of this fact I have seen some very strong proofs, even since the first edition of this Essay was published.

sidered in the second part of this Essay, and I shall, therefore, only glance at some of the others.

The palpitation, or irregular action of the heart, which so often attends disorder of the stomach, is the most alarming of all. Headache, giddiness, noise in the ears, pains over the eye-brows, confusion of thought, defect of memory, and other symptoms about the head, are known, even to a proverb, to depend so often on the state of the stomach, that their existence seldom occasions much anxiety in either patient or practitioner; but when the pulse begins to intermit, and the heart to beat irregularly against the ribs, great danger is usually apprehended by the invalid; and the medical practitioner, who is not well versed in this class of complaints, and accustomed to the use of the stethoscope, is not unfrequently thrown off his guard, and forms a far more melancholy prognosis than the case generally deserves. In these symptomatic affections of the organ of the circulation, however irregular may be the action of the heart and the pulse, they are not accompanied by the other usual attendants on organic disease. The breathing is but little disturbed—the countenance has not the look of distress—the lips are not blue—there is no œdema of the limbs—and the irregular action subsides when the stomach and bowels are empty, and the mind of the patient tranquil. But, as the surest proof of sympathetic disorder, the examination of the heart by the stethoscope, in the intervals, will shew that there is no enlargement, valvular imperfection, or other change of structure present. In such instances, by confining the patient to a rigid diet for a day or two, and gently clearing the bowels, it may be proved to his own satisfaction that there is no disease, nor even permanent disorder of function in the case. It is quite useless to prescribe any medicine for such sympathetic affection—"*sublatâ causâ tollitur effectus.*"*

The sympathetic disorders about the kidneys, bladder, urethra, and rectum, are far more puzzling, and difficult to ascertain. Strictures of the rectum and urethra will sometimes be so completely imitated in disordered states of the digestive organs, that both the urine and fæces will be expelled with considerable pain and difficulty—the *former* in a small twisted stream—the *latter* in flattened and spiral cylinders of very diminutive calibre—while both passages will resolutely resist the introduction of a bougie, thereby confirming the inexperienced practitioner in the belief of permanent organic stricture. It is very common in these cases for patients to complain not only of irritation in making water, but of a sense of pain and smarting in the rectum for some minutes after each discharge of

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* I would advise the practitioner, however, not to treat these affections of the circulation too lightly, or to set them down as merely sympathetic, without careful examination of the chest by the stethoscope. I daily see serious mistakes of this kind made.—10*th Ed.*

urine. The bladder, too, will often be so irritable, that not more than half a pint of water can be retained. This last will generally deposit a sediment, when cold, unless there be much nervous irritability of the mind, when it will be as pale as distilled water. When these symptoms are present, the prognosis should be suspended till the disorder of the digestive organs is removed, or mitigated, as there can be no hurry for the treatment of stricture, even if it be actually of an organic nature. In nine cases out of ten, these symptoms about the two passages will subside, *pari passu*, with the disorder that produced them. In fact, where there is real permanent stricture of either of the canals, there is seldom half so much inconvenience felt as where the stricture is temporary and sympathetic.—Such cases afford a fine harvest for the unprincipled Charlatan, who has little difficulty in persuading the patient that he labours under a disease requiring constant mechanical treatment. This treatment not unfrequently produces the very disease which it is pretended to remove, by the officious interference of bougies, without proper attention to the constitutional disorder on which it depends. In what way, except through the inscrutable channel of morbid sympathy, these affections of the kidneys, bladder, rectum, and urethra, are produced, it is difficult to say—but it is not improbable that the acrimonious secretions themselves may contribute much to the setting up of these local irritations, imitating organic diseases of the parts thus irritated.

Sect. XIII.—Moral Remedies.

The *moral* causes of indigestion and hypochondriasis are very numerous, but not so the remedies. The physician sees and deplores the operation of these causes, but he can do little more than combat their *physical* effects, and thus prevent, as much as possible, their re-action on the mind, through the medium of which they were first directed to certain organs of the body. What power can he exert over the thousand sources of mental anguish, resulting from disappointed ambition, blighted hopes, ruined prospects, reverses of fortune, mercantile losses, domestic afflictions, crosses in love, and all the varied ills to which the spirit as well as the flesh is heir? None have such opportunities of observing the devastations committed on the body by the workings of the mind, as the medical philosopher. None can see the intimate connexion between mind and matter so clearly as he can. If metaphysicians had been physicians, they would not have issued into the world so many absurd speculations on the nature of the mental faculties, which they descant upon as independent of the corporeal organs through which they are manifested. Be this as it may, we find that men, labouring under moral afflictions, especially

if attended with any corporeal disorder, derive but little benefit from the moral lectures of the philosopher, or even the divine, on the virtues of patience, resignation, and calm submission to the dispensations of Providence, and vicissitudes of fortune!—Time, it is true, effects a mitigation of our sorrows, and the mind, like the body, becomes accustomed to painful impressions, and ceases, at length, to feel them with much poignancy. But as certain conditions of our corporeal functions greatly aggravate the mental affliction; so other, and opposite conditions of the same functions do more to fortify the mind than all the lectures of the moralist, the philosopher, or the divine. At all events, the physician can only work through physical agency, leaving to others the pleasing task of curing the wounds of our spiritual nature by the balm of friendship and the consolations of religion.

Sect. XIV.—Travelling-Exercise; or Change of Air and Scene.

It is well known that one impression, whether mental or corporeal, will often supersede, or at least weaken another. This principle is sometimes available in the cure of dyspepsia and hypochondriasis, especially when resulting from moral causes. If the patient's circumstances will permit him to engage in any pursuit that can occupy his attention and exercise his body, it will prove one of the most powerful means of counteracting the original cause, as well as of removing its effects. Unfortunately there are but few, comparatively speaking, whose circumstances will permit of the embarkation in any new pursuit. Yet it is in the power of a great many to engage in a systematic exercise of the body in some mode or other, if they will only summon resolution to make the experiment. The languor and listlessness attendant on the disorder are great obstacles to this plan; but they should be urged to it by all the eloquence of their medical attendants. Some caution, however, is necessary here. The debility and exhaustion which supervene on the most trifling exertion deter most people from persevering, and, therefore, the corporeal exercise must be commenced on the lowest possible scale, and very gradually increased. Thus, a person whose sedentary occupations confine him to the house, might begin by going once to the top of the stairs the first day, twice the second day, and so on, till he could go up and down the same path many times each day. It is wonderful what may be accomplished in this way by perseverance. I have known people, who could not go up a flight of steps without palpitation and breathlessness, acquire in one month, the

power of running up to the top of the house, with scarcely any acceleration of the pulse or respiration. If this kind of ascending and descending exertion, however, is feared, the individual may adopt the plan recommended by Mr. Abernethy, of walking to and fro in the room with the windows open. If the exercise can be taken in the open air, it will be still better, and the quantum may be gradually increased by twenty or thirty steps daily. This task, which should be represented as an infallible remedy in the end, must be performed at first when the stomach is nearly empty; and when an increase of muscular power is acquired, it may be performed at any time—even within two hours after dinner. Those who can engage in any of the lighter gymnastic exercises, should be urged to it by every kind of persuasion, especially in the cool seasons of the year.* These are means within the reach of almost all—and the advantages to be derived from such a system are incalculable. By this systematic exertion of the body, with spare diet, most cases of dyspepsia might be completely cured among the middling and lower classes of society.†

But there is a large class whose *morale* has been too far spoiled—whose education has been too refined—and whose senses have been too much pampered, to benefit by such simple means. There must be some incentive to corporeal exertion stronger than the foregoing plan presents; and moral excitement must be combined with physical agency, if we hope to carry our projects into beneficial operation. That the long catalogue of dyspeptic and hypochondriacal complaints is much more frequently the inheritance of the affluent than the indigent, there can be no doubt; and yet

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* I cannot too strongly impress on the minds of parents the necessity of *gymnastic exercises*. Those who, from false or fashionable ideas, neglect to give their children the physical advantages which result from this *education* of the corporeal powers, are answerable for more than half the bodily ills which befal their offspring in after-life. And if they recollect that the energies of *mind* are mainly dependent on health of *body*, they may probably perceive the moral as well as the physical advantages of gymnastics. At the same time, I must observe that gymnastic *enthusiasts*, like all other enthusiasts, carry corporeal exercise to an extreme, and have injured the cause. I have developed my ideas more fully on this subject in the 15th Number of the Medico-Chirurgical Review, Jan. 1828.

† It is very doubtful which is the most salutary *kind* of exercise—pedestrian or equestrian. I am inclined to agree with Dr. Parry, in giving the preference to the former, as the more natural of the two. But as weakly persons will be induced to ride who would not walk, the horse-exercise is one of our most valuable remedies in dyspepsy, as well as in many other diseases. If the individual, however, could be enticed to commence, and gradually increase, the active or pedestrian species of exercise, it would certainly be far more efficacious in the removal of indigestion and hypochondriacism than the passive, or comparatively passive, exercise of riding. There are some complaints, however, as of the heart and lungs, where passive is safer than active exercise, on account of the temporary excitement of the circulation and respiration occasioned by the latter.

the former class have a remedy in their power which is infinitely more efficacious than all the other moral and physical means put together, but which they rarely take advantage of—or, when they do embrace it, they seldom go the proper way to work. This is TRAVELLING in the open air.

Since the Continent has been open to the English, there has been no lack of this species of exercise; but there are different kinds of travelling now, as there were different kinds of travellers in the days of Sterne. It is one thing to travel for health, and quite another thing to travel for the sake of studying architectural ruins, viewing pictures, ransacking libraries, collecting antiquities, exploring geological formations, or collecting rare and beautiful specimens of plants. It is entirely with the first kind of travelling that I have to do—namely, that mode which conduces most to the restoration of health, leaving every other consideration entirely out of the question, with the exception of *amusement*, which I consider as essentially connected with the subject of health. In the course of a wandering life (over almost every part of the globe), I have had many opportunities of studying and ascertaining the effects of travelling on different diseases, and can vouch for their efficacy.

I. *Moral Effects.*—If abstraction from the cares and anxieties of life, from the perplexities of business, and, in short, from the operation of those conflicting passions which harass the mind and wear the body, be possible under any circumstances, it is likely to be so on such journies as these, for which previous arrangements are made, and where a constant succession of new and interesting objects is presented to the eye and understanding, that powerfully arrests the attention and absorbs other feelings, leaving little time for reflections on the past, or gloomy anticipations of the future. To this may be added, the hope of returning health, increased, as it generally will be, by the daily acquisition of that invaluable blessing as we proceed.

One of the first perceptible consequences of this state of things is a greater degree of serenity or evenness of temper, than was previously possessed. There is something in the daily intercourse with strangers, on the road, and at the TABLE-D'HÔTE, which checks irritability of temper. We are not long enough in each other's society to get into argumentation, or those collisions of sentiment which a more familiar acquaintance produces, and too often raises into altercations, and even irascibility, where the mind and body are previously irritable. These short periods of intercourse are the honey-moons of society, where only good humour and politeness prevail. We change our company before we are intimate enough to contradict each other, and thus excite warm blood. Besides, the conversation generally turns on scenes and subjects with which we are pleased and interested on the road—while political and religious discussions are studiously avoided by all travellers, as if by a tacit but universal compact.

One of the best remedies, then, for irritability of temper, is a tour of this kind. A few hundred pounds would be well expended, annually, by many of our rich countrymen, in applying this pleasant remedy to the mind, when soured and unhinged by the struggles after wealth, rank, or power.

I have already portrayed the influence of bad health, and especially of disordered states of the digestive organs, in producing *depression of spirits*, or mental despondency, far worse to bear than corporeal pain. For the removal of this kind of melancholy, there is no other moral or physical remedy of half so much efficacy as a tour conducted on the plan which I have pointed out. It strikes directly at the root of the evil (as I shall presently shew, when speaking of the *physical* effects of travelling) by removing the causes on which this sombre and irritable state of mind depends. It is true that, in some cases of confirmed hypochondriacism, no earthly amusement, no change of scene, no mental impressions or excitement, no exercise of the body, can cheer the gloom that spreads itself over every object presented to the eye or the imagination! With them, change of place is only variety of woe—cœlum non animum mutant. Yet, from two or three instances which have come within my knowledge, of the most inveterate, and apparently indomitable hypochondriacism being *mitigated* by travelling (though the mode of conducting the journey was far from good), I have little doubt that many cases of this kind, which ultimately end in insanity, or at least in monomania, might be greatly ameliorated, if not completely cured, by a system of exercise conducted on the foregoing plan, and urged into operation by powerful persuasion, or even by force, if necessary. The change for the better, in such cases, is not perceptible at the beginning of the tour; but when the functions of the body have once begun to feel the salutary influence of the journey, the mind soon participates, and the gloom is gradually, though slowly dispelled. Where the mental despondency is clearly dependent on disorder of the digestive organs, and has not yet induced any permanent disease of the brain, an almost certain cure will be found in a journey of this kind, for both classes of complaints. It is hardly necessary to observe that beneficial effects to a greater or less extent, will be experienced in other sombre and triste conditions of the soul, resulting from moral causes, as sorrow, grief, disappointment, crosses in love, &c. by a tour conducted in such a manner as strongly to exercise the body, and cheerfully excite the mind.

I have already shewn the powerful influence of moral causes in deranging the functions of the body through the medium of the intellectual functions. The same functions may be made the medium of a salutary influence. In the greater number of nervous and hypochondriacal complaints, the attention of the individual is kept so steadily fixed on his own morbid feelings as to require strong and unusual impressions to divert it from that point. The monotony of domestic scenes and circumstances is quite inadequate to this object; and arguments not only fail, but absolutely

increase the malady, by exciting irritation in the mind of the sufferer, who thinks his counsellors are either unfeeling or incredulous towards his complaints. In such cases, the majestic scenery of Switzerland, the romantic and beautiful views in Italy and the Rhingau, or the keen mountain air of the Highlands of Scotland or Wales, combined with the novelty, variety, and succession of manners and customs of the countries through which he passes, abstract the attention of the dyspeptic and hypochondriacal traveller (if any thing can) from the hourly habit of dwelling on, if not exaggerating, his own real or imaginary sensations, and thus help to break the chain of morbid association by which he is bound to the never-ending detail of his own sufferings. This is a paramount object in the treatment of these melancholy complaints; and I am convinced that a journey of this kind, in which mental excitement and bodily exercise are skilfully combined, would not only render many a miserable life comparatively happy, but prevent many a hypochondriac and dyspeptic from lifting his hand against his own existence. It would unquestionably preserve many an individual from mental derangement.*

This principle was well understood long before medicine was established as a science. At the extremities of Egypt were two temples dedicated to Saturn, and to these the melancholics or hypochondriacs of ancient days were sent in great numbers. There the priests worked on the body as well as the mind by the pretended influence of supernatural, and the real influence of medicinal agents. The consequence was, that miracles, or at least *miraculous* cures were daily performed. The Romans sent their invalids to Egypt for change of scene; and Hippocrates has distinctly recommended those afflicted with chronic diseases, to change the air and soil—"In morbis longis solum mutare." It would be going out of my province to speak of the benefits of travelling in any other moral point of view than that which is connected with the restoration of health: I shall, therefore, proceed to a consideration of the effects of this combination of mental and corporeal exercise on our bodily functions.

II. *Physical Effects.*—The first beneficial influence of travelling exercise in the open air is perceptible in the state of our corporeal feelings. If they were previously in a state of morbid acuteness, as they generally are in ill-health, they are rendered less sensible. The eye, which was before annoyed by a strong light, soon becomes capable of bearing it without inconvenience; and so of hearing, and the other senses. In short, morbid sensibility of the nervous system generally is obtunded, or reduced. This

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* It must be evident that, in the higher grades of this disorder, the individual should be accompanied by one who understands the rationale of the remedy, and who has good sense and discernment enough to adapt it properly to the strength and other varying circumstances of the patient.

is brought about by more regular and free exposure to all atmospheric impressions and changes than before, and that under a condition of body, from exercise, which renders these impressions quite harmless. Of this we see the most striking examples in those who travel among the Alps, or other mountains. Delicate females and sensitive invalids who, at home, are highly susceptible of every change of temperature and other states of the atmosphere, will undergo extreme vicissitudes among the mountains, without the smallest inconvenience. I will offer an example or two in illustration. In the month of August, 1823, the heat was excessive at Geneva and all the way along the defiles of the mountains, till we got to Chamouni, where we were, at once, among ice and snow, with a fall 40 or more degrees of the thermometer, experienced in the course of a few hours, between mid-day at Salenche, and evening at the foot of the Glaciers in Chamouni. There were upwards of fifty travellers here, many of whom were females and invalids; yet none suffered inconvenience from this rapid atmospheric transition. This was still more remarkable in the journey from Martigny to the Great St. Bernard. On our way up, through the deep valleys, we had the thermometer at 92° of reflected heat for three hours. I never felt it much hotter in the East Indies. At nine o'clock that night, while wandering about the Hospice of the St. Bernard, the thermometer fell to six degrees below the freezing point, and we were half frozen in the cheerless apartments of the monastery. There were upwards of forty travellers here—some of them in very delicate health; and yet not a single cold was caught, nor any diminution of the usual symptoms of a good appetite for breakfast next morning.

This was like a change from Calcutta to Melville Island in one short day. So much for the ability to bear heat and cold by journeying among the Alps. Let us see how hygrometrical and barometrical changes are borne. A very large concourse of travellers started at day-break from the village of Chamouni to ascend the Montanvert and Mer de Glace. The morning was beautiful; but, before we got two-thirds up the Montanvert, a tremendous storm of wind and rain came on us, without a quarter of an hour's notice, and we were drenched to the skin in a very few minutes. Some of the party certainly turned tail; and one Hypochondriac nearly threw me over a precipice, while rushing past me in his precipitate retreat to the village. The majority, however, persevered, and reached the Chalet, dripping wet, with the thermometer below the freezing point. There was no possibility of warming or drying ourselves here; and, therefore, many of us proceeded on to the Mer de Glace, and then wandered on the ice till our clothes were dried by the natural heat of our bodies. The next morning's muster for the passage over the Col de Balme shewed no damage from the Montanvert expedition. Even the Hypochondriac above-mentioned regained his courage over a bottle of Champagne in the evening at the comfortable "Union," and mounted his mule

next morning to cross the Col de Balme. This day's journey shewed, in a most striking manner, the acquisition of strength which travelling confers on the invalid. The ascent to the summit of this mountain pass is extremely fatiguing; but the labour is compensated by one of the sublimest views from its highest ridge, which the eye of man ever beheld. The valley of Chamouni lies behind, with Mont Blanc and surrounding mountains, apparently within a stone's throw, the cold of the Glaciers producing a most bracing effect on the whole frame. In front, the Valley of the Rhone, flanked on each side by snow-clad Alps, which, at first sight, are taken for ranges of white clouds, presents one of the most magnificent views in Switzerland, or in the world. The sublime and beautiful are here protended before the eye, in every direction, and in endless variety, so that the traveller lingers on this elevated mountain pass, lost in amazement at the enchanting scenery by which he is surrounded on every point of the compass. The descent on the Martigny side, was the hardest day's labour I ever endured in my life—yet there were three or four invalids with us, whose lives were scarcely worth a year's purchase when they left England, and who went through this laborious, and somewhat hazardous descent, sliding, tumbling and rolling over rocks and through mud, without the slightest ultimate injury. When we got to the goat-herds' sheds in the valley below, the heat was tropical, and we all threw ourselves on the ground and slept soundly for two hours—rising refreshed to pursue our journey.

Now these and many other facts which I have adduced, offer incontestible proof how much the morbid susceptibility to transitions from heat to cold—from drought to drenchings—is reduced by travelling-exercise in the open air. The vicissitudes and exertions which I have described would lay up half the effeminate invalids of London, and kill, or almost frighten to death, many of those who cannot expose themselves to a breath of cold or damp air, without coughs or rheumatisms, in this country. These facts may suggest some important indications to the physician who has charge of patients labouring under, or threatened with, certain affections of the chest.

The next effect of travelling-exercise in the open air which I shall notice, is its influence on the organs of digestion. This is so decided and obvious, that I shall not dwell long on the subject. The appetite is not only increased; but the powers of digestion and assimilation are greatly augmented. A man may eat and drink things while travelling, which would make him quite ill in ordinary life. A strong proof of its effects on assimilation is afforded by the universal remark that, although much more food is taken in while travelling, much less fæcal remains are discharged, and costiveness is a very general symptom among those who make long and repeated journeys, especially in a carriage or on horseback. The motions, which were previously of bad colour and con-

sistence, soon become formed, or even solid, and of a perfectly healthy appearance. The constipation, which often attends passive or mixed exercise, on these occasions, is hardly ever accompanied by any inconvenience; and travellers will go two or three days without a motion, and experience no disagreeable sensation, although the same degree of confinement of the bowels, at other times, would render them ill, or at least very uncomfortable.

These unequivocally good effects of travelling on the digestive organs, account satisfactorily for the various other beneficial influences on the constitution at large. Hence dyspepsia, and the thousand wretched sensations and nervous affections thereon dependent, vanish before persevering exercise in travelling, and new life is imparted to the whole system, mental and corporeal. In short, I am quite positive that the most inveterate dyspepsia (where no organic disease has taken place) would be greatly mitigated, if not completely removed, with all its multiform sympathetic torments, by a journey of two thousand miles, through Switzerland, Germany, or England, conducted on the principle of combining active with passive exercise in the open air, in such proportions as would suit the individual constitution and the previous habits of life.—This, it is true, is the rich man's remedy. But what is the expenditure of time and money necessary for its accomplishment, compared with the inestimable blessing of restored health? How many thousand opulent invalids saunter away their time and their wealth, at watering-places in this country, during the Summer and Autumn, with little or no improvement of constitution, when a three months' course of constant exercise in the open air would cure them of all their maladies! The fact is—the power of this remedy is little known—and the manner in which it is applied by many invalids is not calculated to shew its worth.*

The kind of exercise under consideration has a marked influence on the absorbent system. It excites this class of vessels into great activity. The fluids, even from the bowels, are rapidly taken up into the circulation, and thrown off by the skin, which is one cause of the constipation to which travellers are subject. This increase of activity in the function of the skin, exerts a very salutary influence on the functions of various internal organs, with which the surface is sympathetically associated. The secretion of bile is thus greatly improved, and this is of no mean consequence in many complaints. To the tropical invalid, with torpid liver and torpid skin, this remedy presents the highest advantages; and I hope the present remarks will induce him not to neglect such an agreeable and useful remedy.

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* It is evident that this restoration, however, will not be lasting, unless the invalid pursues the system of temperance already pointed out, after his return to his usual pursuits, aided by active exercise in the open air.

The effects of travelling, on the absorbents, point at once to the benefits which may be derived from it, in cases where there is a dropsical tendency. In one gentleman whom I knew on this tour, there had been an œdematous state of the lower extremities for many years, but his legs became as small as ever they had been, in the course of one month's travelling. This activity of the absorbents causes the fat and flabby parts of the body to be rapidly reduced, while the exercise and the improved digestion increase the force and firmness of the muscular system. Hence corpulent people become thinner on the journey, but their muscles are increased in size; and what they lose in weight they gain in strength. This salutary change of proportion between the muscular and the adipose systems of the body gives greater freedom to the functions of many important organs, especially to the heart and lungs. Hence people who are easily put out of breath by exercise, or by going up an ascent, soon acquire power to do both, without inconvenience.

The increased activity of the absorbents, during the combination of active and passive exercise in travelling, offers a powerful agency for the removal of morbid growths in the body, such as tumours, scrofulous swellings, &c. and this is one reason why I think great advantage might be derived from travelling, in cases where there is a tendency to consumption,—a disposition so much connected with scrofulous affection both internally and externally.

The effects of travelling on the circulation are peculiar. Active exercise unquestionably quickens the pulse—while passive exercise in a carriage renders it slower. In those diseases of the heart, therefore, where there is enlargement of the organ, with increase of force in the circulation, I think there can be little doubt that travelling, with combined active and passive exercise, would be dangerous, and would be likely to augment the disease. In such cases the exercise should be completely passive, and then the effects would be beneficial. But there are many cases where there is a morbid irritability of the heart, from sympathy with other organs, as the stomach, liver, &c. In these, travelling offers a powerfully salutary remedy, not only by lessening the irritability of the heart, but by improving the functions of those organs with which the heart sympathises. The travelling exercise, in these instances, should be at first entirely passive, and, as the irritability of the organ decreases, active exercise might be gradually ventured on, and progressively augmented. The exercise of travelling, whether active, passive, or both combined, has a very marked influence in producing an equal distribution of the blood to all parts of the body. This important effect must render it a powerful agent in correcting undue determinations of blood to any particular organ or part—a phenomenon which plays a conspicuous part in many of the most dangerous diseases to which the human fabric is liable. Hence the utility of travelling, in many affections of the

head and other parts to which an unequal distribution of blood may be habitually directed.

There is but one other effect of travelling to which I shall allude, before I close this Essay, but I think it is a very important one—if not the most important of all. It is the influence which *constant change of air* exerts on the blood itself. Every one knows the benefits which are derived from change of air, in many diseases, when that change is only from one part to another, a few miles separated. Nay, it is proved, beyond all possibility of doubt that the change from what is considered a good, to what is thought a bad air, is often attended with marked good effects. Hence it is very reasonable to conclude, that the *mere change* of one kind of air for another has an exhilarating or salutary effect on the animal economy. It is true, that we have no instruments to ascertain in what consists this difference of one air from another, since the composition of the atmosphere appears to be nearly the same on all points of earth and ocean. But we know, from observation, that there are great differences in air, as far as its effects on the human body are concerned. Hence it would appear that the human body, confined to one particular air, be it ever so pure, languishes at length, and is bettered by a change. This idea is supported by analogy. The stomach, if confined to one species of food, however wholesome, will, in time, languish and fail to derive that nutriment from it, which it would do, if the species of food were occasionally changed. The ruddy complexion then of travellers, and of those who are constantly moving from place to place, as stage-coachmen, for example, does not, I think, solely depend on the mere action of the open air, on the face, but also on the influence which change of air exerts on the blood itself in the lungs. I conceive, then, that what Boerhaave says of exercise, may be safely applied to change of air. "Eo magis et densum, et *purpureum sanguinem esse*, quo validius homo se exercuerit motu musculorum." It is to this *constant change of air*, as well as to the constant exercise of the muscles, that I attribute the superiority of the plan of travelling which I have proposed, over that which is usually adopted—where HEALTH is the entire object.

Many will think that I have dwelt too much on the subject of exercise, and especially those who have read my other works. But long experience has convinced me that this PREVENTIVE as well as CURE of diseases, multifarious in their shapes, and distressing in their effects, is one of the most important which a physician can point out to his non-professional, as well as his medical brethren. He bequeaths the advice to them as his last precept—and many will have cause to remember it with gratitude, when he is in his grave!

Sect. XV.—Mr. Abernethy's System.

Although there are some whimsical opinions in the rules which Mr. Abernethy has laid down respecting diet and medicine, yet, upon the whole, this able, though eccentric physiologist has done a great deal of good by his doctrines—not entirely unmixed, perhaps, with some harm. The following short summary of his doctrines will be found to corroborate, as far as they go, some of the positions which I have endeavoured to maintain in this Essay.

Mr. A. believing the stomach and other organs of digestion, when disordered, to be in a state of "weakness and of irritability," has for his object "to diminish the former and allay the latter." Believing also that the secretions, in these cases, are "either deficient in quantity or depraved in quality," he endeavours to excite, by means of medicine, "more copious or healthy secretions." As the strength of our body depends on the nutriment we derive from our food, so we must attend to the quantity, quality, and times of taking food and drink. In respect to *quantity*, Mr. A. justly observes that "there can be no advantage in putting more food into the stomach than it is competent to digest, for the surplus can never afford nourishment to the body: on the contrary, it will be productive of various evils." Mr. A. in short, avers that

"Man, in civilized life, having food always at command, and finding gratification from its taste, and a temporary hilarity and energy result from the excitement of his stomach, which he can at pleasure produce, *eats and drinks an enormous deal more than is necessary for his wants or welfare:—he fills his stomach and bowels with food which actually putrefies in those organs:—he also fills his blood-vessels till he oppresses them, and induces disease in them as well as in the heart.*" P. 76.

After this appalling picture of the effects of repletion or intemperance, Mr. A. lays it down as an axiom that, "in proportion as the powers of the stomach are weak, so ought we to diminish the quantity of our food," taking care, however, that it should be nutritive and easy of digestion. By adopting such an abstemious plan of diet, says Mr. A. as may produce even "a sensation of want in the system, we do that which is most likely to create appetite and increase the power of digestion."

In respect to *quality*, Mr. A. observes that "*this* should be adapted to the feelings of the stomach." Some substances that would, *à priori*, be considered indigestible, will agree well even with a dyspeptic stomach. We must, therefore, attend to the peculiarities of individuals and to the instincts of Nature. Regarding the periods of taking food, Mr. A. certainly appears rather eccentric. It is probable, he observes, that three hours may elapse in health before the digestion of a moderate meal is

effected—and the same time, at least, should be allowed when the stomach is disordered. Another three hours should be dedicated to repose of the stomach. He considers that much harm is done by eating too often and fasting too long. He says he could relate many instances of persons who were much emaciated, some of whom were of considerable stature, "becoming muscular and fat upon four ounces of the most nourishing and easily digested food taken three times a day."

Water is considered by Mr. A. as the only real diluent. Diluents, he thinks, should not be taken during or immediately after our meals, since they render the juices of the stomach less efficacious in the digestion of our food. Hunger and thirst, he observes, are incompatible sensations, and were we in a state of nature, thirst would probably not occur till some time after taking food, when drink would not prove injurious. Rest he considers necessary after food, as exertion disturbs the process of digestion. As diluents, he recommends toast-water, mint or balm tea, light ginger tea (when the stomach requires a stimulus), linseed tea, or common tea, "three or more hours after each meal, during the night or early in the morning." In short, he thinks we should not take fluids while the process of digestion is going on. Vinous liquors he regards as stimulant medicines, and are in many cases, useful. But they are very liable to turn acid and prove injurious. They should not be taken, he says, during meals, "lest the temporary excitement they produce should induce them to take more food than the powers of the stomach are capable of digesting; but, afterwards, they may be allowed so much of them as may be required to induce agreeable feelings"—or rather "to prevent those uncomfortable sensations which the want of them may occasion—and it may be added, that the less of them the better." P. 84.

So much for dietetics. In respect to medicines, Mr. A. observes that —"purging medicines sometimes relieve unpleasant sensations; but they do not, in general, produce even this effect; and all active purges seem to me to increase disorder. It is natural to suppose that strong stimuli will aggravate the unhealthy condition of weak and irritable parts." 90. In order to correct the vitiated state of the biliary secretion, Mr. A. recommends the blue-pill, generally in five-grain doses every second night. "The relief which arises from the increase or correction of the biliary secretion, in a great number of these cases, shews how much the liver is concerned in causing or aggravating the symptoms in these diseases." 93. He has known patients who had voided "nothing but black stools for some months, discharge fæces of a light yellow colour, denoting a healthy, but deficient secretion of bile, immediately upon taking such small doses of mercury." Mr. A. remarks, also, that "the effect of this change on the constitution and spirits has been surprisingly great, *though the state of the stomach did not appear to be altered.*" Mr. Abernethy is a strong advocate for exercise in the open air. "Many people who are extremely irritable

and hypochondriacal, and are constantly obliged to take medicines to regulate their bowels, whilst they live an inactive life, no longer suffer from nervous irritation, or require aperient medicines, when they use exercise to a degree that would be excessive in ordinary constitutions." The following is a recapitulation in his own words.

"I would prescribe to my patients the following rules:—They should rise early when their powers have been refreshed by sleep, and actively exercise themselves in the open air till they felt a slight degree of fatigue; they should rest one hour, then breakfast, and rest three hours, in order that the energies of the constitution should be concentred in the work of digestion; then take active exercise again for two hours—rest one; then, taking their dinner, they should rest for three hours, exercise two—rest one—and take their third slight meal."

He does not allow bad weather to prevent the regular quantum of exercise, "since it is in the power of every one to protect themselves from cold by clothing, and the exercise may be taken in a chamber, with the windows thrown open, by walking actively backwards and forwards, as sailors do on ship-board."

Such are the celebrated dietetics and hygiene of this talented and eccentric surgeon, as developed at page 72 and following sheet of his work, so often quoted by others—so often recommended by himself.

Mr. A. remarks at the said page 72 as follows:—"I do not feel altogether competent to give full directions relative to this subject; because *I have never attended to medical cases with that degree of observation which would lead me properly to appreciate the efficacy of different medicines,* when administered either in their simple or compounded forms." Notwithstanding that nine in ten of Mr. Abernethy's morning patients, for 25 years past, have been purely medical cases, without any local complaint whatever; yet I believe the above passage to be literally true. Mr. Abernethy does not appear to have profited by the immense field of observation which lay before him; and nearly the same plan of treatment is, therefore, laid down for all patients indiscriminately—the same in the ninth as in the first edition of the work.

The principles of his work are less objectionable, however, than the practice. Mr. A. has entirely overlooked that large and preponderating proportion of cases where the irritability of the gastric and intestinal nerves is unconnected with, or, at all events, not dependent on, the faulty state of the hepatic and other secretions. In these cases, the five grains of blue-pill at night, and the salts and senna every other morning, will ultimately increase the malady. Indeed, in a note to the ninth edition, published in the year 1827, Mr. A. informs us that he has perused Dr. Hamilton's work on purgative medicines, and considers himself very fortunate in finding the coincidence of practice between Dr. H. and himself. Nothing is more certain, however, than that Dr. Hamilton's purgative plan

is destruction to the great majority of dyspeptic patients, as thousands and thousands have found to their cost. As the practice, then, of Mr. Abernethy is founded almost exclusively on the idea of disordered secretions and loaded bowels, so it leaves entirely out of view the important indications of counter-irritation and local depletion in affections of the stomach and bowels. As far as I can judge of Mr. A.'s practice, too, the tonic plan, so beneficial after abstemiousness and alterative medicines, is very inefficiently employed. The various causes of the disease, and the manner in which the mind acts on the body, and the body on the mind, are not at all investigated: which is the more to be regretted, since no man ever had a wider field for observation—or probably ever will have in future. I should not have ventured to make this remark on Mr. Abernethy's sins of *omission*, had he not fully and candidly acknowledged them himself in the above passage. He has profited, in one sense of the word, by the innumerable patients who have portrayed their disorders before him; but he has still left for future observers the toil and the difficulties of investigation. "The subject," says he, "is so important, that the public would be highly indebted to any practitioner who would point out the varieties of these diseases, and the appropriate modes of cure."—*Page* 73.

But in pointing out what I conceive to be defects in Mr. Abernethy's *medicinal* treatment of dyspeptic complaints, I can have no hesitation in acknowledging the benefit which he has conferred on the profession, and on society at large, by the able manner in which he has advocated the good effects of temperance, and delineated the many evil consequences which flow from the ingurgitation of too much food and drink.

Latterly, this distinguished surgeon appears to have been somewhat less inclined to recommend his book to the patient, in addition to the prescription. He has, therefore, printed directions for diet, which, of course, like the bed of Procrustes, *must fit* the patient. The following is the printed formula or dietary.

"THE RULES OF DIET, IN DYSPEPTIC CASES, may be thus stated in an abbreviated form:—

"1. The food should be of the most nourishing and readily digestible kind.

"2. The quantity taken at a meal should not be more than it is probable the stomach will perfectly digest.

"3. The meals should be taken at regular periods of six hours, three times a day: and when the stomach can digest very little food, they may be taken four times in twenty-four hours.

"4. Every meal of food should be reduced to minute subdivision and pulpy consistence by mastication, or otherwise: and suffered to

remain in the stomach unmixed with liquids, in expectation that it will be dissolved by the juices of the stomach.

"5. Drink should be taken four hours after each meal; allowing that time for its perfect digestion, and two hours for the conveyance of liquids from the stomach before the pulpy food be again received.

"6. The drink then taken should not contain fermentable substances. It should be boiled water; which may be flavoured with toast, or prevented from producing a qualmish state of stomach, by pouring it upon a trivial quantity of powdered ginger.

"It is not meant by these rules to debar persons from taking a small tea-cupful of liquid with breakfast, or a glass or two of wine with dinner, if it seems to promote the digestion of their food."

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